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| **Date** | **Comment** |
| 1/5/2010 | Evaluated current status and came up with preliminary plan of action.   STATUS ASSESSMENT Definition: CFP - allow user to move through a 3D envelope of sufficient size ~ a) move freely within envelope (play around with various linkage arrangements and include tool position and user location - build them  goal: select a linkage - make sure has required envelope - make sure can sure can be actuated - make sure everything can be attached (actuators, ... - make sure facilitates user/tool entry (lateral and frontal entry) - make sure that user feel is adequate - make sure that can make necessary cuts (what are we cutting out?) - make sure gravity compensation will be OK?  CFP Current Progress - generated potential mechanism - evaluated through physical and MATLAB prototypes - eliminated mechanisms (PT1, PT2)  CFP Current Action Items: - update, refine and document remaining prototypes  - PT1 Document changes (PT1 to PT1b 'PT4 from CFP') Nic  - PT1b document physical assessment, document how hard constraint can be implemented (may still be issues with user feel) Nic  - PT2 Document Failure, Nic  - PT3a Assess physically, change model to include equivalent linkage lengths, (may still have issues with user feel, twisting?) David  - PT3b Assess physically, change model to incorporate rotational joint that acts linearly, document how hard constraint can be implemented (should be identical to linear joint) David  - recompile report RELATED FUNCTION RESEARCH - document implant shape (what we are going to cut) ERICA - document tool possibilities (what types of tools can/will be used) - document physical verification of graphs (does the model actually make sense? how does bone/knee integrate with model?) - develop criteria for drive train - develop criteria for gravity compensation - develop criteria for controller - develop criteria for tool orientation for each prototype - create list of types of potential electrical components (pro/con list) - create list of potential types of motor and drive train (pro/con list) - create preliminary software flow chart - create and evaluate and document potential layout for drive train on prototypes - prove that tool can be used anywhere in envelope with given implant shape (consider surface position with respect to approach (lateral/frontal) - where spherical bit is cutting) |
| 1/7/2010 | List of task copied out from the board.  - CFP must be completed by Thursday Jan 14 - Rough Draft CFP by Tuesday Jan 12 before Tony meeting 10AM - CFP concepts and evaluation (Mon Jan 11) - includes gravity compensation (DAVE), tool requirements and positioning (implants, tools, the approach) (NICH) requires Dave's model and Erica's implants, drive train design and assembly - how hard constraint will be implement and assessment of result (IBRAHIM and ERICA), physical description of model - why model makes sense - more detailed description of requirements found in Jan 5 scheduling outline (DAVE),  - Technical Report due Mon Jan 25 - TR outline due Tuesday Jan 19 (general content and plan to present to Tony - first attempt at simulations and analysis) - TR rough draft due friday Jan 22 - TR editing and revision completed over the weekend  Technical Report Initial Breadown - gravity compensation (how to implement, resulting virtual weight) (DAVE, NIC) - controller (software, motor controller, timing requirements, microcontoller, all other electrical components) (DAVE, DAVY, ERICA) - drive train (motor, gears, bearings, backlash, accuracy, ordering requirements and timing) (IB, ERICA) - structural (manufacturing and materials, parts requirements, deflection, accuracy, life assessment/reliability, size, weight,  ) (DAVE, ERICA) |
| 1/8/2010 | KNex Meeting  conclusion  -top heavy design (requires gravity compensation)  -spring mechanism could be implemented for GC in linear direction but rotational compensation is more complicated (2GC -> 2 dimensions)  -size concerns to get necessary range  Linear range: 12cm-16.5cm  Offset: 9cm  Link 4: 10cm  -likely to provide necessary range this size  Refer to picture. |
| 1/9/2010 | Meccano Meeting  PT3a  -link1: 75mm  -link2: 75mm  -link3: 60mm  -link4: 120mm  PT1a  -link1: 55mm  -link2: 75mm  -link3: 50mm  -link4: 65mm  -link5: 95mm  remarks:  -sufficient workspace  -better motion to link1  -flexible tool joint improves user feel significantly  -surgical approach was difficult to assess, but it seems that frontal approach is more effective (this may be due to the lack of gravity compensation)  -frontal approach allowed user to provide support  -user could access entire workspace with one approach  -mechanism is likely to restrict vision of workspace  Observations  -mechanism performance is largely similar to PT3a  -must consider same issues  Conclusion  -design must implement rotation about joint 1  -flexible tool joint minimizes impact of fixed link3 and provide good feel with 2DOF  -joint4 provides necessary range using simple pin joint  -additional joints will be considered during technical analysis report  -cannot comment on overall size however linkage design provides necessary range  -will be optimized during analysis  Actions items  -motors & gears (types & position)  -how hard constraint will be implemented  -relate to overall size & weight |
| 1/12/2010 | Cancelled due to absences |
| 1/14/2010 | -went over the geometry of the links to derive a useable function  -created a list of items to do for the following week  David  \* contact Abe what he wants for the models  \* fix matlab  \* block diagram, pseudo code draft  \* structural analysis (let Nich know what he needs to do)  Davy  \* pseudo code  \* cost/benefit analysis of microcontrollers  Erica  \* motor controller analysis (work with Abe, bug him until you get what you need)  \* contact Plaskos/send CFP  \* find implant models  Nich  \* gravity compensation analysis  \* structural analysis (Dave will let you know what to do, bug him if he doesn't)  Ibrahim  \* work with Erica on motor controllers (give her requirements, specs, etc)  \* motor analysis  \* bearing analysis |
| 1/19/2010 | -went over status of CFP  -Nich is finishing up  -Erica will edit and compile  -discussed about the difficulties of TAR  -Ibrahim needed more information on how to choose a motor  -Davy needed more information on what to analyze for the electrical/software  -Erica needed more instructions  -setup meeting Chris  -Erica will follow-up  -Nich will call  \*will meet again on Thursday to clarify details of what to do for TAR |
| 1/26/2010 | -went over TAR responsibilities  -Dave will  -determine link length based on model  -determine spring size  -discussed on issues with manufacturing with stainless, titanium or aluminum |
| 2/1/2010 | Meeting with Chris  -refer to meeting notes in “meeting files” |
| 2/2/2010 |  |
| 2/4/2010 | -went over timeline  -must start order for control system  -Ib presented results on analysis of encoders  -.5mm translation of end-effecter changes angle on average 1.5 degrees  -must choose encoder more accurate than that  -control system  -presented prototype 1 and 2 implementations and issues |
| 2/9/2010 |  |
| 2/18/2010 | Skype meeting  -went over gravity compensation selection of motor and encoder  -discussed about the control system required for gravity compensation |