Meeting Purpose:

1) Overview of the Project
2) Confirm Engineering Specifications and Customer Needs
3) Review Concepts
4) Propose a design approach and confirm its functionality

Materials Reviewed:

1) Project Description and Mission Statement
2) Team Values and Norms
3) One Page Summary
4) Stakeholders list
5) Project Plan (w/ Gantt Chart)
6) Customer Needs
7) Concept Generation Selection
8) Engineering Specifications
9) System Analysis and Function Tree
10) System Design
11) Risk Assessment

Attendees:

Allison Schneider (Mechanical Engineering) – Dubai Market Researcher
Andrew Thistle (Mechanical Engineering) – Field Technician Concierge
Dylan Connolle (Mechanical Engineering) – International Field and Market Research Technician
Kelsey McConnaghy (Mechanical Engineering) – Systems Engineer
Sergey Chiripko (Mechanical Engineering) – Project Manager
Wayne Evans (Mechanical Engineering) – USA Technical Lead
Gerald Garavuso – Project Guide
Dr. Edward Hensel – Project Customer

Meeting Date: January 13, 2011
Meeting Location: Alumni Room (09-2550)
Meeting Time: 7:00 – 9:00 A.M. EST / 4:00 – 6:00 P.M. Dubai

Meeting Timeline

Start Time (EST)	Topic of Review	Required Attendees
7:00	Project Description and Mission Statement (Sergey)	Gerry Garavuso, Dr. Hensel
7:05	Team Values and Norms (Allie)	Gerry Garavuso, Dr. Hensel
7:15	One Page Summary (Sergey)	Gerry Garavuso, Dr. Hensel
7:20	Questions from Customer and Guide	Gerry Garavuso, Dr. Hensel
7:25	Project Plan (w/ Gantt Chart) (Sergey)	Gerry Garavuso, Dr. Hensel
7:35	Stakeholders List (Team)	Gerry Garavuso, Dr. Hensel
7:50	Customer Needs (Kelsey)	Gerry Garavuso, Dr. Hensel
8:00	Questions from Customer and Guide	Gerry Garavuso, Dr. Hensel
8:05	System Analysis and Function Tree (Kelsey)	Gerry Garavuso, Dr. Hensel
8:15	Engineering Specifications (Wayne)	Gerry Garavuso, Dr. Hensel
8:25	Concept Generation Selection (Team)	Gerry Garavuso, Dr. Hensel
8:35	System Design (Team)	Gerry Garavuso, Dr. Hensel
8:45	Risk Assessment (Dylan)	Gerry Garavuso, Dr. Hensel
8:50	Questions from Customer and Guide	Gerry Garavuso, Dr. Hensel

P11411 Mission Statement

Our goal is to design and fabricate an educational water desalinization tool for RIT and RIT Dubai students that will demonstrate the small scale operation of a desalinization unit in an educational laboratory setting. In the process, we will identify and provide solutions to international logistical issues encountered while working in a multi-national and multi-cultural environment.

The primary focus of this project is to better understand the desalinization process by focusing on designing and manufacturing a single laboratory-scale desalinization unit. This project will fall within the cleaning module/function of the Sustainable Water System roadmap family. The secondary focus of this project is to study and document processes, tools, and techniques for multi-national multi-disciplinary senior design projects. This project will provide the foundation upon which all future multi-national MSD projects between our two campuses complete their senior design projects in a collaborative environment. In order to support this secondary focus, we will intentionally limit the technical scope related to the primary focus.

Senior Design Project Data Sheet

Project #	Project Name	Project Track	Project Family
P11411	Water Desalination System for Dubai	Energy and Sustainable Systems	Water Cleaning Systems
Start Term	**Team Guide**	**Project Sponsor**	**Doc. Revision**
2010-2	Gerry Garavuso	Dr. Edward Hensel	2 (Jan. 2011)

Project Description

Project Background:

This project is a pioneering project within the Sustainable Water Systems family roadmap, and first one to focus on desalination water cleaning efforts. It is not a direct continuation of a previous senior design project, but an MSD team would find it useful to reference 'Water Desalination P08401' MSD project to gain a better perspective on this cleaning process. The project objective is to develop a cleaning technology that will be placed in a series with a biological cleaning system to achieve both a salt/mineral free and bio-contaminant free water stream. This project is very important to not only the growing region of Dubai, but to the rest of the world as well. Understanding the desalination process is therefore a critical component of these efforts, and this project will develop an educational tool to do so.

Problem Statement:

The primary focus of this project is to better understand the desalination process by focusing on designing and manufacturing a single laboratory-scale desalination unit. This project will fall within the cleaning module/function of the Sustainable Water System roadmap family.

Objectives/Scope:

1. An educational water desalination tool for RIT and RIT Dubai students that will demonstrate the small scale operation of a desalination unit.
2. The hardware product at the end should be appropriate for both USA and UAE student teams to build upon.
3. The project will lay the foundation for future MSD teams that will correspond and work between RIT and RIT Dubai.

Deliverables:

- Educational Desalination Unit
- Manual and Instructions on how to operate unit
- Infrastructure for future international MSD projects between RIT and RIT Dubai

Expected Project Benefits:

- Educational desalination tool for upper level RIT and RIT Dubai students
- Provide foundation for developing a sustainable water system on RIT Dubai campus

Core Team Members:

Sergey S Chiripko Jr., Wayne Evans, Kelsey McConnaghy, Allison Schneider, Dylan Connole, Andrew Thistle

Strategy & Approach

Assumptions & Constraints:

1. The hardware product at the end should be appropriate for both USA and UAE student teams to build upon.
2. This project should clearly identify and solve logistics problems associated with multi-national MSD projects.
3. The primary application and objective for this project is educational so that MSD teams gain experience with desalination for subsequent MSD teams to build upon

Issues & Risks:

- Multicultural and Multinational Logistics, Technical Requirements
  - During 20102, half of the team will be studying abroad in Dubai while the other half remains in Rochester
  - Cultural, communicational, and national difference exist for members in Dubai
  - There has never been a cross-continental MSD project at RIT so the project must be technically sound and successful to build this infrastructure
  - Unpredictable weather conditions in Rochester could delay project or demand costly simulation.

Stakeholders List:

Stakeholder Groups	Representative Stakeholders	Stakeholder Classification
RIT Dubai	Dr. Mustafa AG Abushagur	Secondary
RIT Dubai	Dr. Ghoneim	Secondary
RIT Dubai	Dr. Freiss	Secondary/User
RIT Dubai	Facilities Manager (John Mitchell)	Secondary
RIT Dubai	Construction contractors	Business Interest
RIT Dubai	Supplier vendors	Business Interest
RIT Dubai	RIT Dubai Students	User
RIT Dubai	RIT Dubai Faculty	User
RIT USA	Dr. Edward Hensel	Primary Customer
RIT USA	Supplier vendors USA	Business Interest
RIT USA	RIT USA Students	User
RIT USA	RIT USA Faculty	User
RIT USA	Sarah Brownell	Secondary

Stakeholder Classifications Defined:

Primary - This stakeholder is the main customer for this project and has the most invested into this project outside of the team.

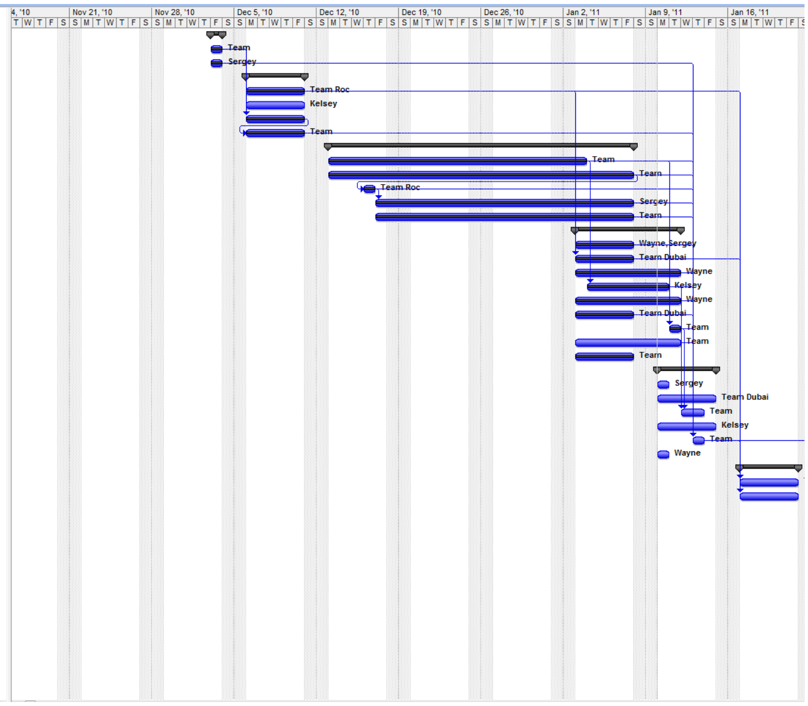
Secondary - This stakeholder has an interest in the project through the interest in the direction of the MSD program in Dubai.

User - This stakeholder will be interfacing with the machine. They will be operating and/or maintaining the system.

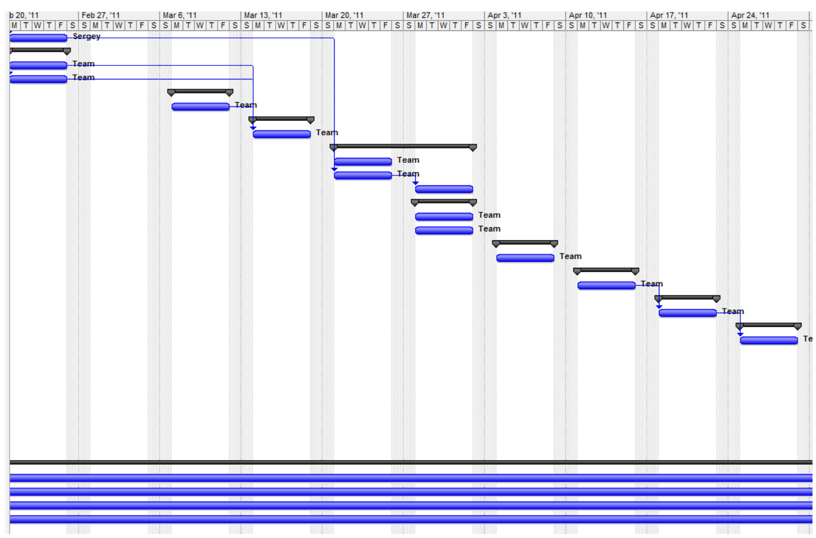
Business Interest - This stakeholder has an interest in the project based on sales of goods or services.

Project Plan (w/ Gantt Chart):

		Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	✓	**Week 1**	**1 day?**	**Fri 12/3/10**	**Fri 12/3/10**		
2	✓	Choose Project Manager	1 day?	Fri 12/3/10	Fri 12/3/10		Team
3	✓	1 Page Project Summary	1 day?	Fri 12/3/10	Fri 12/3/10		Sergey
4		**Week 2**	**5 days?**	**Mon 12/6/10**	**Fri 12/10/10**		
5	✓	HW1	5 days?	Mon 12/6/10	Fri 12/10/10		Team Roc
6		Rochester and Dubai Water Standards	5 days?	Mon 12/6/10	Fri 12/10/10		Kelsey
7	✓	Define Rolas and Responsibilities	5 days?	Mon 12/6/10	Fri 12/10/10	2	
8	✓	Norms and Values	5 days	Mon 12/6/10	Fri 12/10/10	7	Team
9	✓	**Week 3**	**20 days?**	**Mon 12/13/10**	**Fri 1/7/11**		
10	✓	Project Functions	16 days?	Mon 12/13/10	Mon 1/3/11		Team
11	✓	Customer Objectives	20 days?	Mon 12/13/10	Fri 1/7/11		Team
12	✓	Interview with Hensel	1 day?	Thu 12/16/10	Thu 12/16/10	11	Team Roc
13	✓	Customer Needs	16 days?	Fri 12/17/10	Fri 1/7/11	12	Sergey
14	✓	Stakeholders List	16 days?	Fri 12/17/10	Fri 1/7/11		Team
15		**Week 4**	**7 days?**	**Mon 1/3/11**	**Tue 1/11/11**		
16	✓	Mission Statement	5 days?	Mon 1/3/11	Fri 1/7/11		Wayne,Sergey
17	✓	HW2	5 days?	Mon 1/3/11	Fri 1/7/11	5	Team Dubai
18	✓	House of Quality	7 days?	Mon 1/3/11	Tue 1/11/11		Wayne
19	✓	Project Concepts	5 days?	Tue 1/4/11	Mon 1/10/11	10	Kelsey
20	✓	Engineering Specifications	7 days?	Mon 1/3/11	Tue 1/11/11		Wayne
21	✓	Risk Assessment	5 days?	Mon 1/3/11	Fri 1/7/11		Team Dubai
22	✓	Research Functions	1 day?	Tue 1/11/11	Tue 1/11/11	10	Team
23		Research Benchmarks	7 days?	Mon 1/3/11	Tue 1/11/11		Team
24	✓	Peer Evaluations	5 days?	Mon 1/3/11	Fri 1/7/11		Team
25		**Week 5**	**5 days?**	**Mon 1/10/11**	**Fri 1/14/11**		
26		Required Resources	1 day?	Mon 1/10/11	Mon 1/10/11		Sergey
27		Dubai Desalination Plant Tour	5 days?	Mon 1/10/11	Fri 1/14/11		Team Dubai
28		System Analysis and System Design Options	2 days?	Wed 1/12/11	Thu 1/13/11	19,22	Team
29		Student Surveys	5 days?	Mon 1/10/11	Fri 1/14/11		Kelsey
30		Systems Design Review	1 day?	Thu 1/13/11	Thu 1/13/11	3,8,10,11,12,13,1	Team
31		System Design Drawings	1 day?	Mon 1/10/11	Mon 1/10/11		Wayne
32		**Week 6**	**5 days?**	**Mon 1/17/11**	**Fri 1/21/11**		
33		HW3	5 days?	Mon 1/17/11	Fri 1/21/11	5,17	Team Roc
34		Bill of Materials	5 days?	Mon 1/17/11	Fri 1/21/11	30	Sergey
35		**Week 7**	**5 days?**	**Mon 1/24/11**	**Fri 1/28/11**		
36		CAD, Schematcs, Code Diagrams Simulation	5 days?	Mon 1/24/11	Fri 1/28/11	30	Team
37		Feasibility Analysis	5 days?	Mon 1/24/11	Fri 1/28/11		Team Dubai
38		Risks and Mitigation	5 days?	Mon 1/24/11	Fri 1/28/11		Team Roc
39		Knowledge and Understanding	5 days?	Mon 1/24/11	Fri 1/28/11		Team
40		**Week 8**	**5 days?**	**Mon 1/31/11**	**Fri 2/4/11**		
41		Project and Test Plan	5 days?	Mon 1/31/11	Fri 2/4/11		Team
42		**Week 9**	**5 days?**	**Mon 2/7/11**	**Fri 2/11/11**		
43		Detailed Design Review	5 days?	Mon 2/7/11	Fri 2/11/11		Team
44		**Week 10**	**10 days?**	**Mon 2/14/11**	**Fri 2/25/11**		
45		Project Review	5 days?	Mon 2/14/11	Fri 2/18/11	43	Team
46		Order Parts	5 days?	Mon 2/21/11	Fri 2/25/11	45	Sergey
47		**Week 11**	**5 days?**	**Mon 2/21/11**	**Fri 2/25/11**		
48		Project Design File	5 days?	Mon 2/21/11	Fri 2/25/11		Team



		Task Name	Duration	Start	Finish	Predecessors	Resource Names
46		Order Parts	5 days?	Mon 2/21/11	Fri 2/25/11	45	Sergey
47		**Week 11**	**5 days?**	**Mon 2/21/11**	**Fri 2/25/11**		
48		Project Design File	5 days?	Mon 2/21/11	Fri 2/25/11		Team
49		Go or No Go Revision	5 days?	Mon 2/21/11	Fri 2/25/11	45	Team
50		**Week 12**	**5 days?**	**Mon 3/7/11**	**Fri 3/11/11**		
51		Closure of Action Items	5 days?	Mon 3/7/11	Fri 3/11/11		Team
52		**Week 13**	**5 days?**	**Mon 3/14/11**	**Fri 3/18/11**		
53		Final Test Plan	5 days?	Mon 3/14/11	Fri 3/18/11	48,49,51	Team
54		**Week 14**	**10 days?**	**Mon 3/21/11**	**Fri 4/1/11**		
55		Assembly Manufacturing Plan	5 days?	Mon 3/21/11	Fri 3/25/11		Team
56		Receive Parts	5 days?	Mon 3/21/11	Fri 3/25/11	46	Team
57		Assembly	5 days?	Mon 3/28/11	Fri 4/1/11	56	
58		**Week 15**	**5 days?**	**Mon 3/28/11**	**Fri 4/1/11**		
59		Assembly	5 days?	Mon 3/28/11	Fri 4/1/11		Team
60		Testing and Refinement	5 days?	Mon 3/28/11	Fri 4/1/11		Team
61		**Week 16**	**5 days?**	**Mon 4/4/11**	**Fri 4/8/11**		
62		Testing and Refinement	5 days?	Mon 4/4/11	Fri 4/8/11		Team
63		**Week 17**	**5 days?**	**Mon 4/11/11**	**Fri 4/15/11**		
64		Testing and Refinement	5 days?	Mon 4/11/11	Fri 4/15/11		Team
65		**Week 18**	**5 days?**	**Mon 4/18/11**	**Fri 4/22/11**		
66		Testing and Refinement	5 days?	Mon 4/18/11	Fri 4/22/11	64	Team
67		**Week 19**	**5 days?**	**Mon 4/25/11**	**Fri 4/29/11**		
68		Testing and Refinement	5 days?	Mon 4/25/11	Fri 4/29/11	66	Team
69		**Week 20**	**5 days?**	**Mon 5/2/11**	**Fri 5/6/11**		
70		Project Review	5 days?	Mon 5/2/11	Fri 5/6/11		Team
71		Technical Paper	5 days?	Mon 5/2/11	Fri 5/6/11		Team
72		Poster	5 days?	Mon 5/2/11	Fri 5/6/11		
73		**Week 21**	**5 days?**	**Mon 5/9/11**	**Fri 5/13/11**		
74		Final Demo, Sponsor Demo and Transfer Comple	5 days?	Mon 5/9/11	Fri 5/13/11		Team
75		**Week 22**	**5 days?**	**Mon 5/16/11**	**Fri 5/20/11**		
76		Project Design File	5 days?	Mon 5/16/11	Fri 5/20/11		Team
77		**Ongoing**	**125 days?**	**Mon 11/29/10**	**Fri 5/20/11**		
78		Researching Dubai Material Costs	125 days?	Mon 11/29/10	Fri 5/20/11		Team Dubai
79		Updating Engineering Logbooks	125 days?	Mon 11/29/10	Fri 5/20/11		Team
80		Updating Roles and Responsibilities	125 days?	Mon 11/29/10	Fri 5/20/11		Team
81		Updating International Logistics	125 days?	Mon 11/29/10	Fri 5/20/11		Team



Customer Needs:

Customer Needs Defined from Dr. Hensel

1	Limited technical scope to allow for a strong focus on international logistics and challenges.
2	Desalinate at least 2 liters of Persian Gulf (or equivalent) water per day from average ocean salinity to a level usable for agricultural purposes. The size of the system will be driven by this water requirement.
3	The system is preferred to be usable by second to fifth year level engineering students in order to perform laboratory experiments in an educational setting. A trained operator would be the one directing the system operation. System should fit in a laboratory setting and be transportable.
4	The challenges faced due to the international team dynamics will be documented thoroughly as well as possible solutions developed as seen fit for these challenges. The team needs to be thorough with respect to recording logistics, technical issues, and multi-cultural/national design issues.
5	Product Manual - Documentation of assembly and instructions on how to operate the device must be included in the final delivery of the project to allow other groups to easily continue working on the project product or integrate it into other systems
6	Solar energy is preferred to be harnessed and used for the desalinization process. However, other a combination of renewable and non-renewable energy sources can be utilized as seen fit.

Customer Needs Defined From RIT Students 4th and 5th year

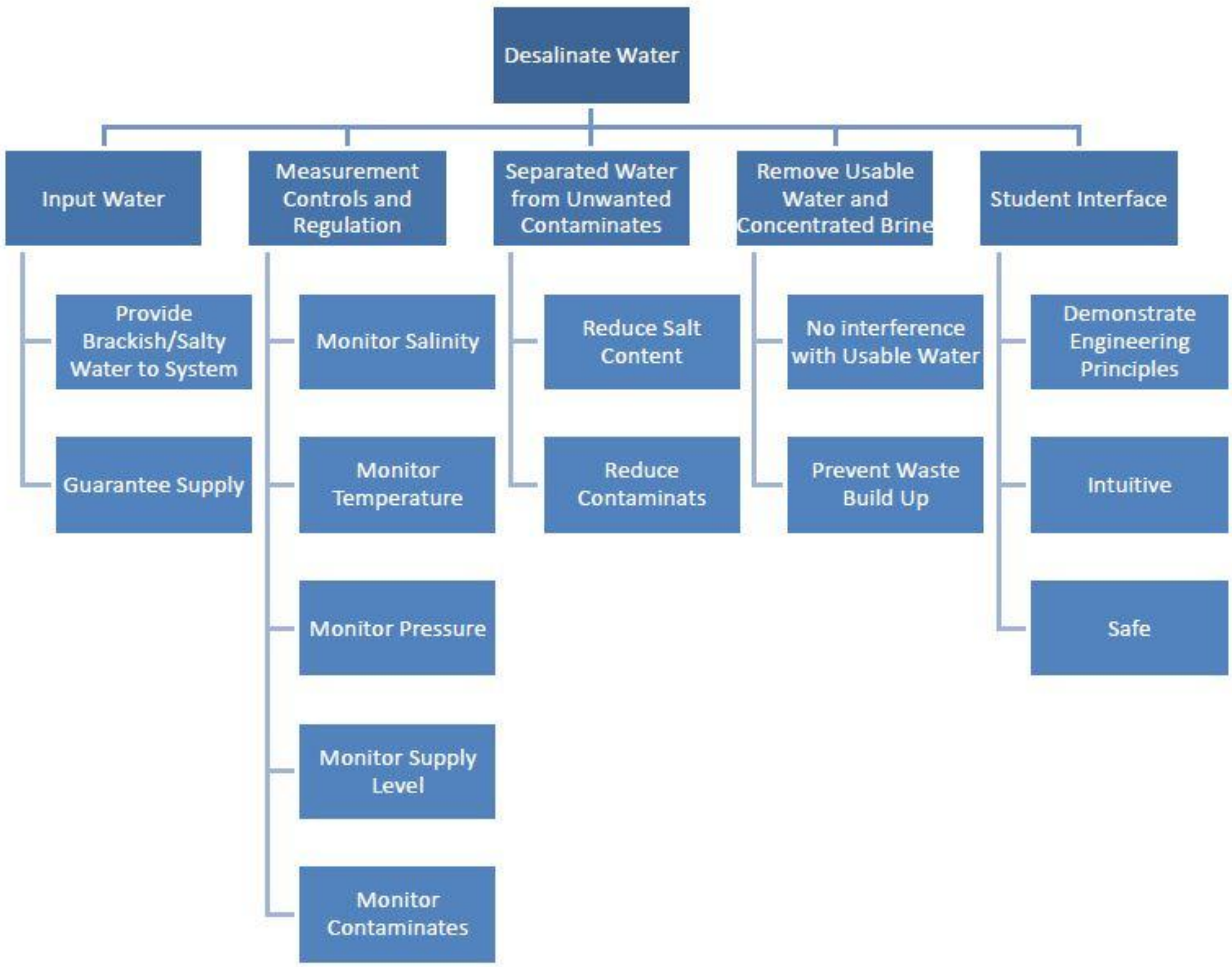
1	Having theoretical models greatly help in the understanding of the engineering topics shown in an experiment.
2	Working in groups is the preferred method of conducting a lab experiment, either for the entire lab or for half of the lab.
3	Students find it beneficial to physically see something happening during a laboratory experiment. (Sometimes to always)
4	Students find discussion sections that pose questions to be answered more beneficial to learning

Engineering Specifications:

Voice of Engineer

	Separate Water from Contaminants			Remove Useable Water and Wastewater		Effective Student Interface			Effectively Measure & Control System						Input Water	
Engineering Specifcation Number	a.1	a.2	a.3	b.1	b.2	c.1	c.2	c.3	d.1	d.2	d.3	d.4	d.5	d.6	e.1	e.2
Engineering Specifcation Description	Reduce Salt Content	Reduce Contaminant Content	Harness Renewable Resource	Remove Useable Water	Remove Waste	Effectively demonstrate engineering principles	Intuitive to operate system	Operate Safely	Measure Salinity	Measure Contaminants	Control Water Input	Measure Temperature	Measure Pressure	Measure Supply Level	Input water from unuseable wate source	Guarantee water supply to system
Measure of Performance	% Salinity	% Contaminants	% Power Used from Renewables	ml/min	ml/min	# Student Interfaces	# Hrs Training Required	# Precautions	% Accuracy	% Accuracy	% Accuracy	% Accuracy	% Accuracy	% Accuracy	ml/min	Reaction Speed
Preferred Direction	Down	Down	Up	Up	Up	Up	Down	Up	Up	Up	Up	Up	Up	Up	Target	Down
Nominal Value																
Marginal Value																

System Analysis and Function Tree:



Input Water

Primary Option: Manual Supply Tank and Filter
Secondary Option: Gravity Fed Tank and Filter

Inputting water should be very simple and not be a means of complication to the system. Using a pump requires it to be salt water compatible and needs power to run. Using a screw drive or crank system can utilize an alternative form of power but would require a person or animal to constantly be operating.

In order to keep this section of the system very straight forward, I feel that a gravity fed tank or constantly pouring water into the tank would be the simplest option for now. Since the device is meant to process enough water for 1 person per day the device would only need to be filled once per day. This also would be the most applicable for a laboratory setting since it will not be utilized every day. In the future this aspect of the design could be unproved. The reason that the gravity fed tank is secondary is that a stand would have to be constructed in order to hold the tank above the inlet of the system.

Another major suggestion is to include a filter to eliminate any "extra" contaminates before they get into the separation part of the tank.

Separating Water from Contaminants

Primary Option: Solar Still integrated with Parabolic Trough

The Solar Still, by itself, will meet the minimum requirements of the customer. The design is simple and bulletproof. This project will be taking a step beyond the previous SD team project by integrating the parabolic trough. Hopefully this will increase the rate of water output drastically.

Secondary Option: Solar Still integrated with Closed Loop Parabolic Trough

If designed with modularity in mind, but also with an interesting student interface added for consideration, then a closed loop parabolic trough would be a good option to integrate. This means a working fluid transferring the solar thermal heat to a solar still. This could also work without the Solar Still if temperatures are high enough by going to a ‘black box’ and transferring thermal energy to water and causing brackish/salty water to boil.

Measurements & Controls

Primary Option: Computer controlled measurement and control system.

This is the most reliable and easiest to change on the fly. Additionally we can acquire necessary DAQ equipment within the department resulting in little expenditure, program ourselves, and receive knowledgeable help when necessary. This provides an easy to use GUI for students and provides easy data collection.

Secondary Option: PID measurement and control system.

PID controllers are small and easy to use in simple systems, but they have less flexibility to be adjusted on the fly and are less intuitive to create a user friendly GUI. Can have major cost advantage, especially in high volumes. Due to availability of other equipment and the lack of size constraint for our single unit production this option was not chosen.

Removing Usable Water

Primary Option: Removing Water using Solar Still

Since a solar still is the primary and secondary option purposed ,the natural condensation which is part of this system will be how the water is collected. This process will take time, however the process could take less time by running cool water or cool air on the outside of the condensing surface. The only downfall for including a cooling system is complications to the solar still, however this could be an additional component that could be added at a later time. The only addition to the solar still will be a collection tank for the usable water.

Removing Concentrated Brine

Primary Option: Computer Controlled Salinity Measurement

Using a solar still allows for a trough that will hold the brine at the base of the system and allow it to concentrate as the desalinated water is removed. The final recommendation is to monitor the salinity level and once it exceeds a limit (which will need to be set by the specifications) the brine will be removed. This can be accomplished by a release valve located in the bottom of the trough that is either manually operated or controlled by the computer interface. If the release valve is manually operated, there should be an alarm in the computer program which tells the user it is time to release the brine. This was thought to be the best option, even though it is more complicated than the secondary option, because it will allow for interaction between user and device and aid in the data collection process.

Secondary Option: Float Valve

A secondary option is to use a float valve which will monitor the overall level of the lower trough. When the level becomes too low (also will need to be set by specifications) a valve will be lifted and the brine released. This valve could also be connected so a new batch of brine filled the tank.

Student Interface

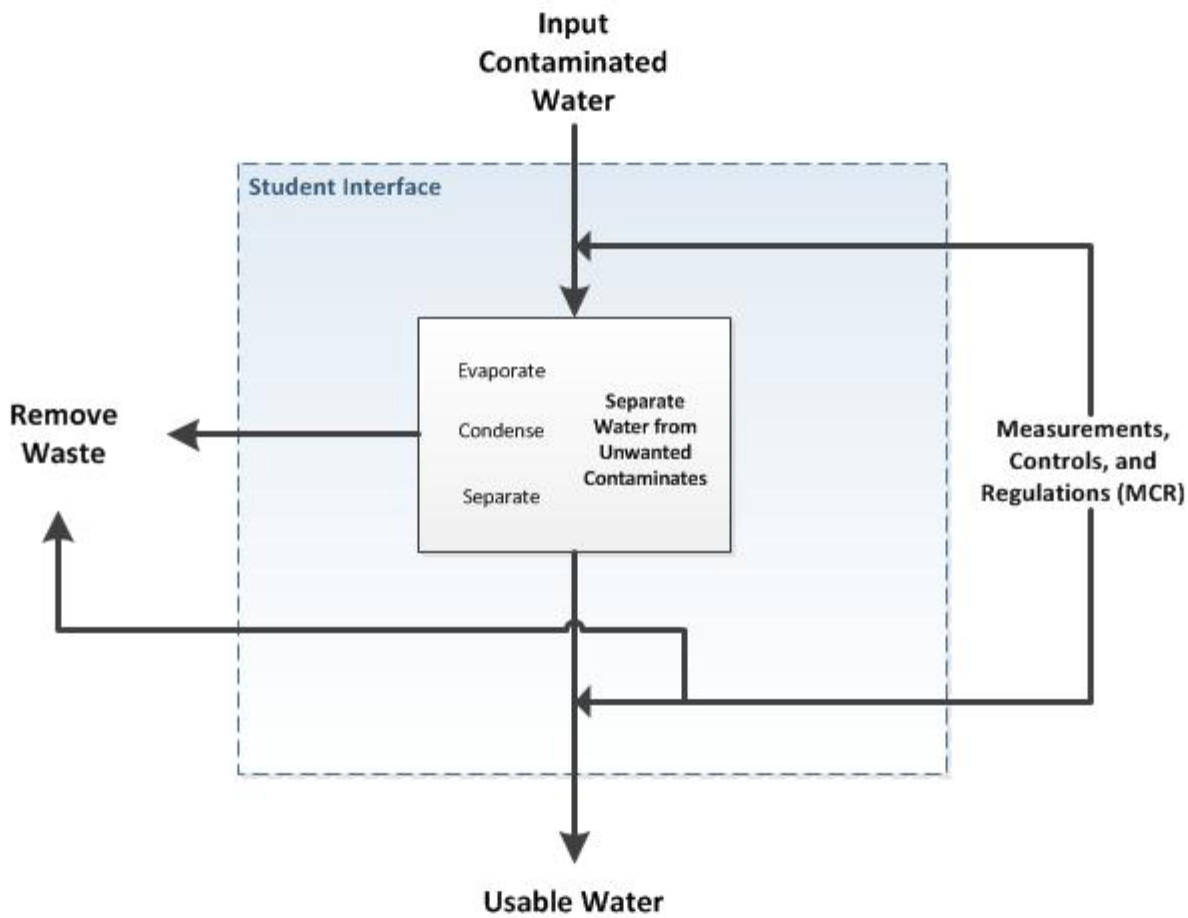
Primary Option:

Implement safety precautions including a factor of safety, color coding, and labels to avoid injury. Proper personal protective equipment will be required for anyone using the unit. User friendly and visually interesting computer control program will be developed which students can easily use. Operation manual or user handbook will be created to ensure knowledgeable use of the system.

Secondary Option:

Less failsafe design catered to older students. Create additional student involvement procedures, lab exercise or demo procedure, to demonstrate key engineering concepts used in the solar desalination system. Have more student control and less computer control. Factor of safety will need to be increased. The concepts demonstrated in the system can be used to teach all age groups and this option would limit that.

System Design:



Risk Assessment:

MSDI Project Risk Assessment (P11411)

ID	Risk Item	Effect	Cause	Likelihood	Severity	Importance	Action to Minimize Risk	Owner
	Describe the risk briefly	*What is the effect on any or all of the project deliverables if the cause actually happens?*	*What are the possible cause(s) of this risk?*			*L*S*	*What action(s) will you take (and by when) to prevent, reduce the impact of, or transfer the risk of this occurring?*	*Who is responsible for following through on mitigation?*
1	Losing a team member	Work reallotted, knowledge lost, less man hours	Arrest (deportation), Leave of absence, Emergency, team conflict	1	3	3	Detect conflict and lack of integrity early on, use a third party mediator and personal counsel to mitigate. -dynamic	Team
2	International logistics (miscommunication)	Missed deadlines, misinterpretations Lack of communication Few overlapping work hours	Skype malfunction, e-mail malfunction, failure to inform others, physical distance, shipping time, customs, time zones	3	2.5	7.5	Skype meetings conducted on campus with meeting notes recorded in duplicate and e-mailed for validation. Agenda for each meeting sent out prior to meeting date for review. Staying on task to reduce confusion. Mondays	Team Leader (Sergey)
3	Miscalculations	Unacceptable deliverables, failure to produce working demo unit, hardware and safety issues, more time consumed	Sleep deprivation, unit conversion, negligence, rushing, invalid assumptions, invalid models	2	3	6	Have work checked by peer on team. Always work in metric units (and $). Take your time. Validate models/ensure realistic results. Prioritize and plan to avoid rushed work. –Dynamic	Team
4	Over budget	Incomplete demo unit, increased man hours, system redesign	Expense of solar collector, oversized system, salt resistant components, consumables, outsourcing costs	1	3	3	Assign a treasurer position to be elected next meeting. Their tasks will include keeping a detailed budget as well as tracking and planning expenditures. -1-10-11	Treasurer
5	Under sizing system	Nonfunctioning demo unit, inefficient system	Miscalculations, over budget	1	3	3	Model system –MSD 2 Incorporate factor of safety	Team
6	Weather fluctuations	Demonstration limited/ineffective	Clouds, location, solar eclipse,	3	2	6	Review weather forecast, Multiple test dates , solar lamps if	Team

			seasons				necessary– demo day	
7	Limited demo usability	Project mothballed after completion, minimal student interaction	Lack of human interface, lack of explanation, under sizing, material choice(lack of transparent materials), transportability	2	2	4	Incorporate user friendly interface, dynamic data displays, short warm up time	RIT Dubai
8	System Integration malfunction	Demo unit fails, safety hazard, inaccurate data logging	Negligence, component incompatibility, tolerances, miscalibration	1	3	3	Test unit thoroughly prior to demo. Purchase compatible components. -MSD 2	Team
9	Availability of specific hardware	Increased man hours due to producing our own components, delays in delivered components	Location, technicality of project, material choices, vendor stock, cost	2	2	4	Use OEM components, order special items early on.	Team/Treasurer
10	Vendor lead time	Delays in delivered components, incomplete system	Cost, location, business hours	1	2	2	Use stock parts, order special items early on.	Team

Likelihood scale	Severity scale
1 - This cause is unlikely to happen	1 - The impact on the project is very minor. We will still meet deliverables on time and within budget, but it will cause extra work
2 - This cause could conceivably happen	2 - The impact on the project is noticeable. We will deliver reduced functionality, go over budget, or fail to meet some of our Engineering Specifications.
3 - This cause is very likely to happen	3 - The impact on the project is severe. We will not be able to deliver, or what we deliver will not meet the customer's needs.

"Importance Score" (Likelihood x Severity) – use this to guide your preference for a risk management strategy	
Prevent	Action will be taken to prevent the cause(s) from occurring in the first place.
Reduce	Action will be taken to reduce the likelihood of the cause and/or the severity of the effect on the project, should the cause occur
Transfer	Action will be taken to transfer the risk to something else. Insurance is an example of this. You purchase an insurance policy that contractually binds an insurance company to pay for your loss in the event of accident. This transfers the financial consequences of the accident to someone else. Your car is still a wreck, of course.
Accept	Low importance risks may not justify any action at all. If they happen, you simply accept the consequences.

Discussion:

Action Items					
Item #	**Description**	**Responsible**	**Due Date**	**Close Date**	**Comments**
A001					
A002					
A003					
A004					
A005					

Issues					
Item #	**Description**	**Responsible**	**Open Date**	**Close Date**	**Comments**
I001					
I002					
I003					
I004					
I005					

Decisions				
Item #	**Description**	**Contributing Individuals**	**Decision Date**	**Comments**
D001				
D002				
D003				
D004				
D005				