Meeting on 9 Dec 12 focused on narrowing ideas from concept generation. Each team member researched potential concepts and the findings were discussed and evaluated.

Flow visualization/motor control speed (Danny):

- Electrolysis
  - 50-70 V DC, 1 amp
  - Safety is concern
  - Bad: creates chlorine gas, turned paperclip brown
  - Pulsing current possibility
- Aquarium aerator: microbubble diffuser
  - Easier solution
  - Microbubbles rise to surface slower

	Ease of Use	Continuous Use	Educational Value	Cost	Maintenance
Electrolysis	4	2	1	4	2
Aerator	3	1	3	2	1
Dye	1	4	4	3	4
Particulate	2	3	2	1	3

Pump control (Danny):

- Electronic control valve after pump
  - Controls water flow to water table
  - Remaining water diverted back to reservoir
  - Controlling pump during operation is difficult
    - Can use variable frequency, but it is expensive ($200+)
  - Could use mechanical valve for both flow control and water expulsion

Test Fixture (John)

- See attached notes

How to move water (Andrew)

- Pump
  - Pump is available
  - Adaptable
  - By constraints, most viable option
- Waterwheel
- Buckets
  - Low cost. Ridiculous
- Propeller

Water Storage (Andrew)

- 50-60 gallon drum
  - Cheapest. Easier to hold. Pipe/pump interface needed. Easier to calculate. Easier to build

- Tank
- Keep water in water table
    - Cheapest, no separate cart. Not modular, would not meet customer needs

Cart + Water Table Interface (Andrew)
- Two separate carts
- Locking mechanism between carts (?). Locking wheels.

Flow Measuring (Andrew)
- Bulk flow meter.
    - Able to integrate in series with system. Best option
- Comparing pressure sensors
    - Must narrow flow, complicated geometry

Inputing Water into System (Andrew)
- Garden hose
    - Fastest flow
- Buckets
    - Requires human interaction. Possibility of spilling

Cart (Andrew)
- Commercial Cart
    - Easier to build. No design work. More expensive. More professional
- Custom Cart

Flow Straighteners (Tim)
- Tube type bundles
    - Able to manufacture, length dependent on flow velocity
- Honeycomb conditioner
    - Not practical for higher flow velocities. More expensive
- “Rainbow” Design
    - As seen in 1936 streamline video. Easiest to manufacture. Dependent on geometry though.

Test Section Geometry (Tim)
- Flat rectangular
    - Viewable from top & sides. More construction involved
- Tube
    - Viewable from 360 degrees. Less components. More expensive, harder to integrate into system.

Test Section Material (Tim)
- Plexiglass
    - Chips & cracks easier. Less expensive. 92% light transmission.
- Lexan

Resistant to rbeaking. More Expensive. 88% light transmission

Glass

Cracks/shatters. Heavier. Harder to cut. More glare/reflection

Test Section Sealant (Tim)

Silicone

Boat/marine/fish tank applications for water-tight sealing. Does not harden (is flexible and removable)

Marine Epoxy

Very strong. Hardens (is permanent)

Expelling Water (Tim)

Plug/Drain Hole

COTS part, inexpensive, potential for leaks. Time dependent on gravity

Divert from pump

Faster expulsion of water. Requires T-valve.

Reverse to reservoir

Requirement of bi-directional pump. Re-use water.

Spunges/Sham-wows

Unprofessional. May be used to finish drying after removing

Concepts to think about:

- Water table geometry to keep water at certain height with certain flow rate
- Mechanism to rotate geometry for attack angle