PTC® the product development company

PTC Student Design Competition

New Jersey FTC State Championship
February 28, 2016
NJIT

PTC / NJ FTC DESIGN CHALLENGE
FEBRUARY 2016 CHAMPIONSHIP

Competition

For the sixth year, NJ FTC is reprising their on-site modeling Challenge (originally based on the student design competition offered at the FIRST Championship in St Louis in the past). The Challenge consists of three main components: Design Concept, CAD Execution Plan and a Model. The first two are be done prior to the event, but the model must be created live at the NJ FTC Championship on Feb 28th .

Step 1: Register to enter the Challenge at vincent.frascella@baesystems.com .

Step 2: Pick a Design Challenge Scenario and brainstorm with your team. Come up with a design and prepare some documentation that can be used to present the concept and the plan for designing it. Then… practice, practice, practice on a part of it or the whole package or whatever you think would be best. You can build parts from scratch or use the kit of parts from FTC competitions.

Step 3: Stop by Pit Admin at the state championship and hand in your Design Concept and CAD Execution Plan. You will be assigned a 20 minute design session for the "live" modeling challenge.

Judging Criteria

Design Concept
You can use a paper sketch, CAD model, drawings, or whatever will best convey your ideas. Bring your documentation to the NJ FTC State Championship; they must be turned in at Pit Admin when you sign up for a design session. Your concept will be judged on its novelty and overall potential.

CAD Execution Plan
This is a written plan and sketch of how you will create the detailed CAD model in CREO. Your plan will be evaluated on plan thoroughness and effectiveness.

Model
You will be given a 20 minute session at the state championship to show your PTC skills by modeling some part of your proposed robot. It can be the overall package or one part of it. Your model will be judged on its technical merit and completeness. Bots must be within the 18" size limit.

A bank of laptops, equipped with PTC software, will be available at NJIT. You will be allowed to bring one custom part with you on a memory stick, to be loaded by our PTC Challenge staff.

Design Challenge Scenarios

Scenario 1: "Crow's Nest Duty" – This robotic crew member needs to quickly shimmy up a the ship's white, 30-foot, 5-inch diameter pole to the Crow's Nest. There actually is no crow's nest per se, only a 3-inch "stop-stripe" around the top of the pole. It would be helpful for your shimmying look-out to take note of the stop-stripe before flying overboard. Once at the top of the pole, extra points are given for a robot that can revolve around it to look for any sign of danger, on the ship's full horizon.

Scenario 2: "Swab the Deck" – Being on its first voyage, this new crew member is assigned deck-cleaning duty. Of course being a robot, it need not use a bucket and mop. Instead it shoots a stream of water onto the deck surface, then shoots a stream of soap, then happily dances around the deck to the "Pirate's Waltz". Extra points for "crew-member avoidance system" (anti-showering system) lest the new crew member makes enemies early in the voyage.

Scenario 3: "Walk the Plank" – Uh, oh …your robot captive is being made to walk the plank (OK, they can roll across the plank) and into the drink. A cheer goes up from the pirate crew as your robot drops off the end of the plank and out of view. Little does the crew know that it has actually swung around the underside of the plank and, though out of sight, is making its way back toward the ship to cause more mischief. Extra points if the robot includes hidden armament which detonates when coming in contact with the ship's outer hull.

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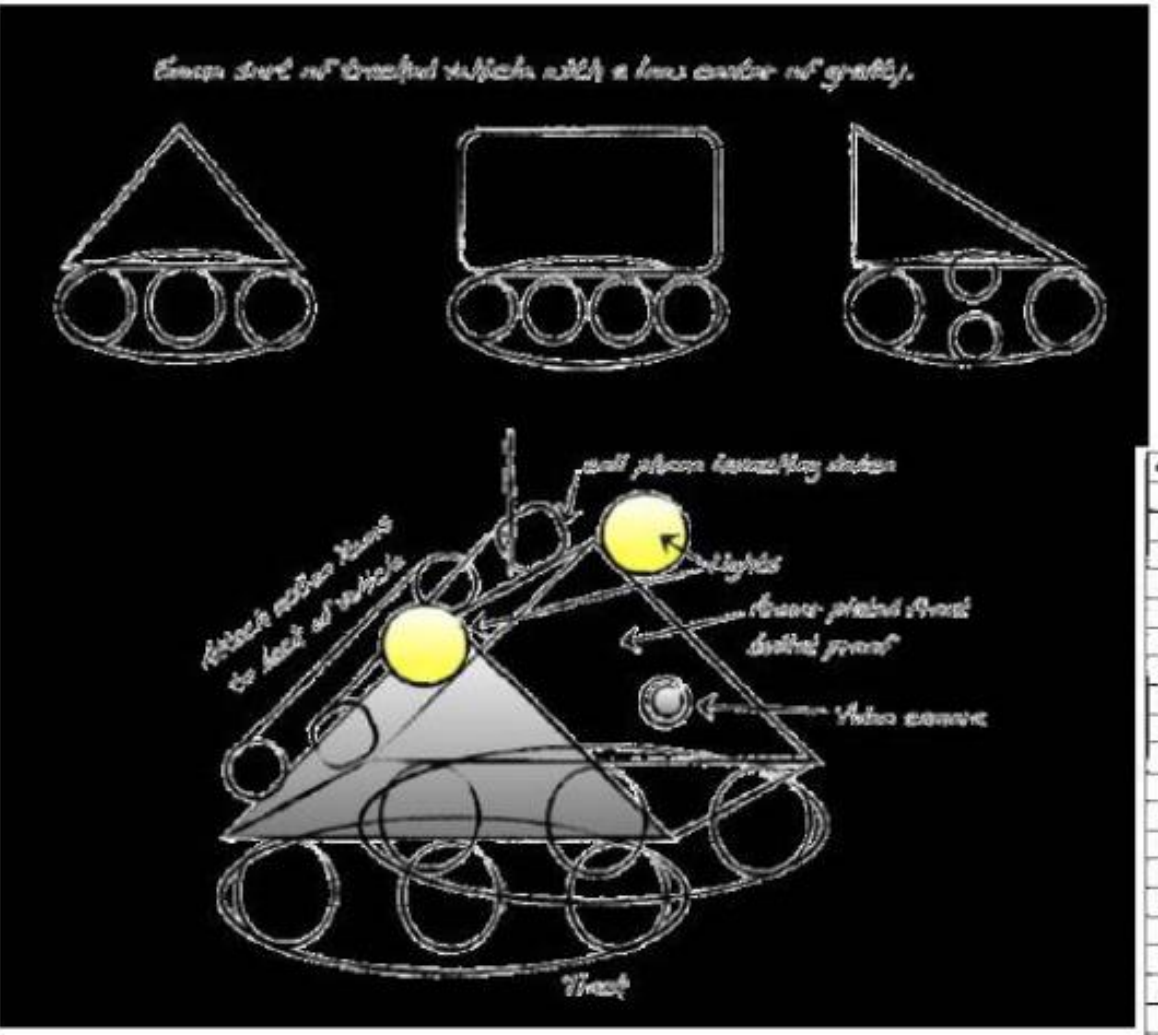
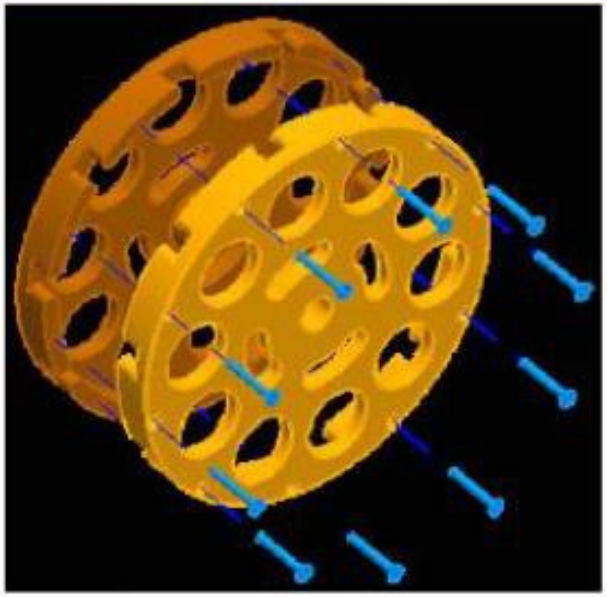
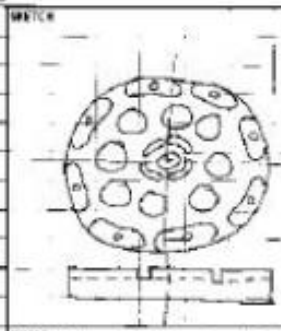
Design Concept, CAD Execution Plan, Model





CAD MODEL PLAN	2 PIECE DRIVE WHEEL
1	DEF DATUMS, MAIN AXIS
2	MAIN WHEEL SKETCH
3	TREAD TOOTH SKETCH
4	HOLE SKETCH
5	SLOT SKETCH
6	INNER BOSS SKETCH
7	EXTRUDE WHEEL
8	EXTRUDE (+) TREAD TOOTH
9	EXTRUDE (+) HOLE
10	EXTRUDE (+) SLOT
11	EXTRUDE (+) BOSS
12	PATTERN TOOTH
13	PATTERN HOLES
14	PATTERN SLOTS
15	CHAMFERS
16	4-40 BOLT CIRCLE HOLES
17	- CSINK CLEARANCE
18	
19	
20	



NOTES: MATCH TREAD KEYS
- KEEP SKETCHES ON DTMS
- - NOT ON GEOMETRY
- BLANK SKETCHES
- LINK 4-40 HOLES TO THE TREAD TEETH
- COPY MODEL
- - REDEFINE 4-40 HOLES TO BLIND DMF