



The Radio Club of America, Inc.
Technical Symposium
Orlando, FL

**Combining Robotics, Amateur Radio,
and Emergency Services**

Presentation by
Chris Blackwood KD2CXC
Devlin Murray KC2PIX
November 23, 2013

Devlin Murray, KC2PIX

- First licensed in early March 2006
- Interested Programming and Automation
- Joined FIRST Team 219, September 2008
- Returned as mentor after graduating

The Murray Family



Kevin
K2FN

Devlin
KC2PIX

Jeanmarie
N2WTQ

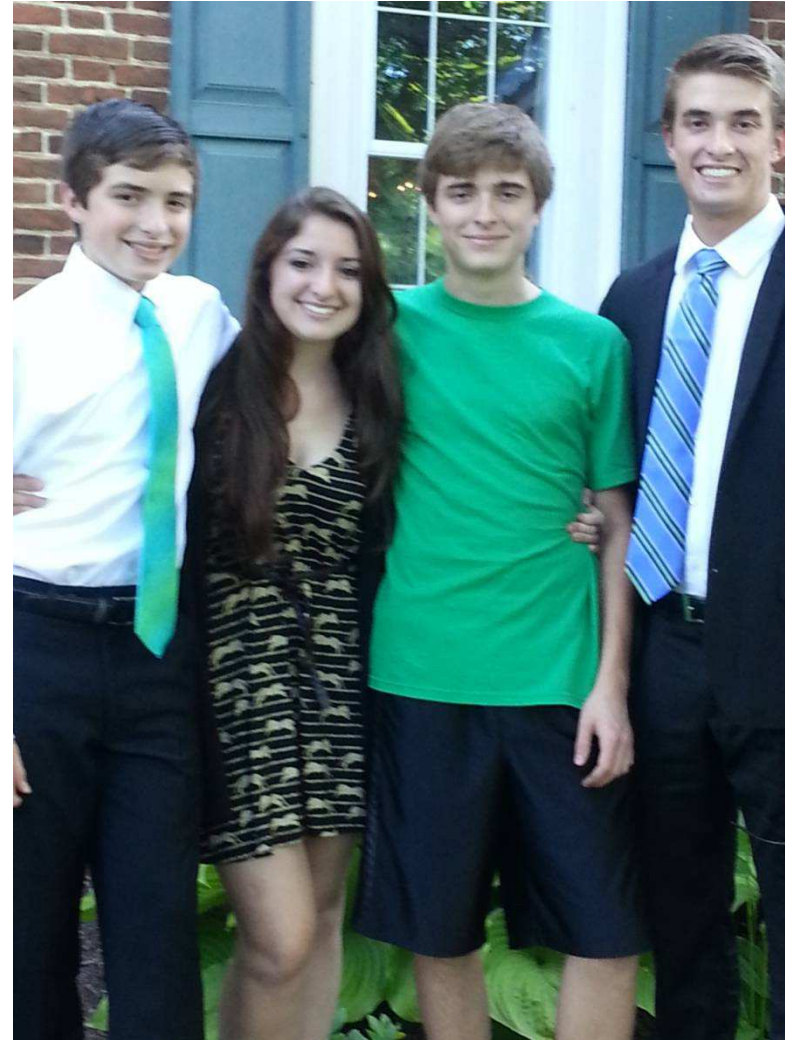


721st Mechanized Contest
Battalion

Chris Blackwood, KD2CXC

- First licensed in early October 2012
- Interested in home brewing and building
- Joined FIRST Team 219, September 2011
- Met other people with similar interests

Obligatory Photos



721st Mechanized Contest
Battalion



721st Mechanized Contest Battalion

- A rag-tag bunch of high school students and adult mentors
- Primary focus Amateur Radio Contests
- Involved in many aspects of Radio, Robots and Making



721st Mechanized Contest Battalion



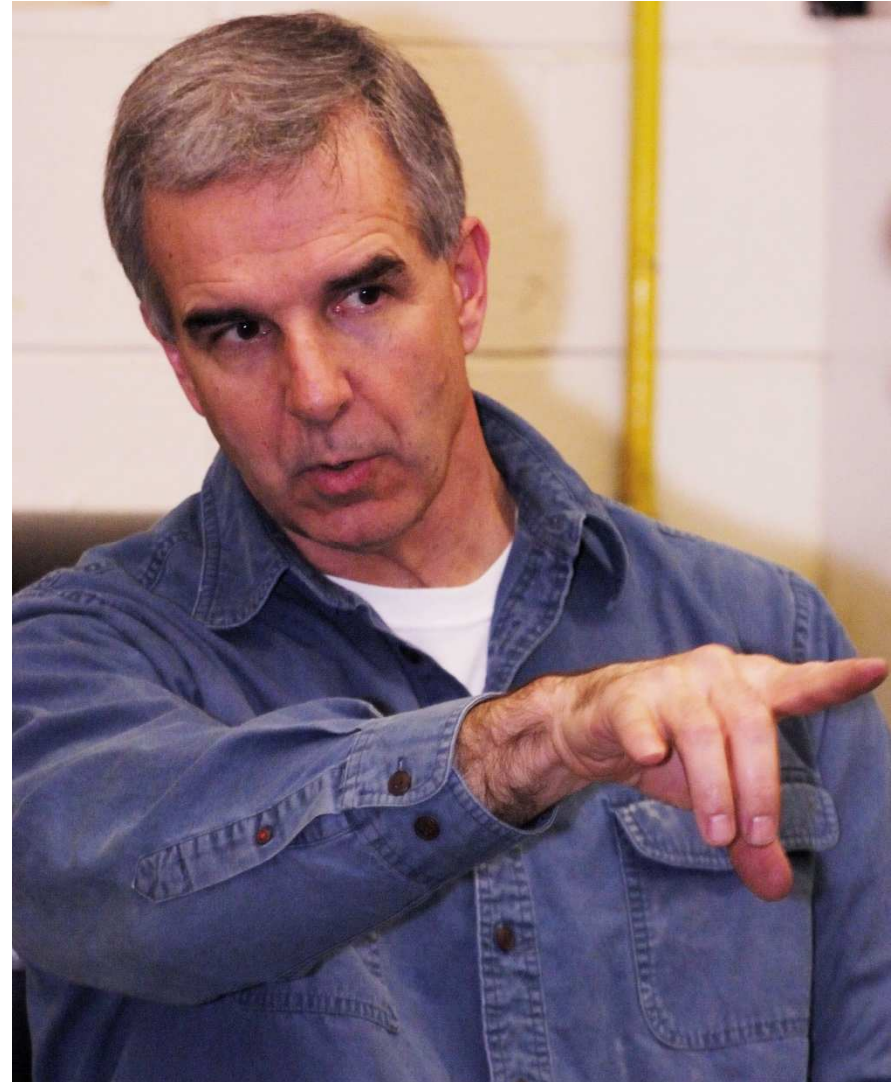
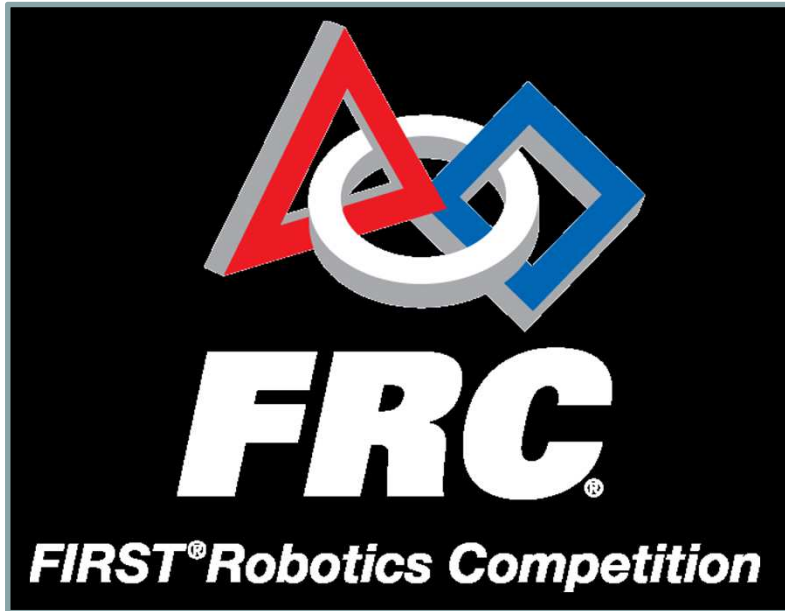
We have a truck ...



...and we know how to use it!

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**Dave Rader, Coach of Team
219**

Warren Hills Regional High School
TEAM IMPACT
Washington, Warren County, NJ



Proud recipient of the **Xerox Creativity Award**
at the 2010 NJ Regional FIRST Robotics Competition

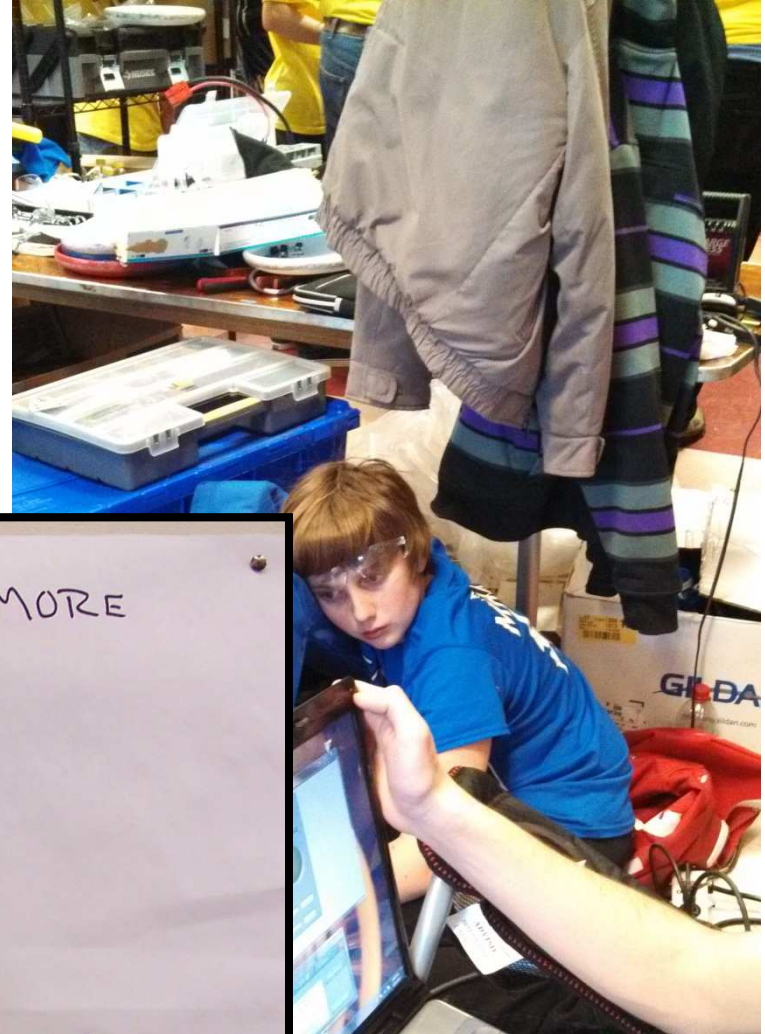
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THERE IS MORE
TO LIFE THAN
ROBOTICS
just NOT during
JANUARY
FEBRUARY OR
MARCH !!!



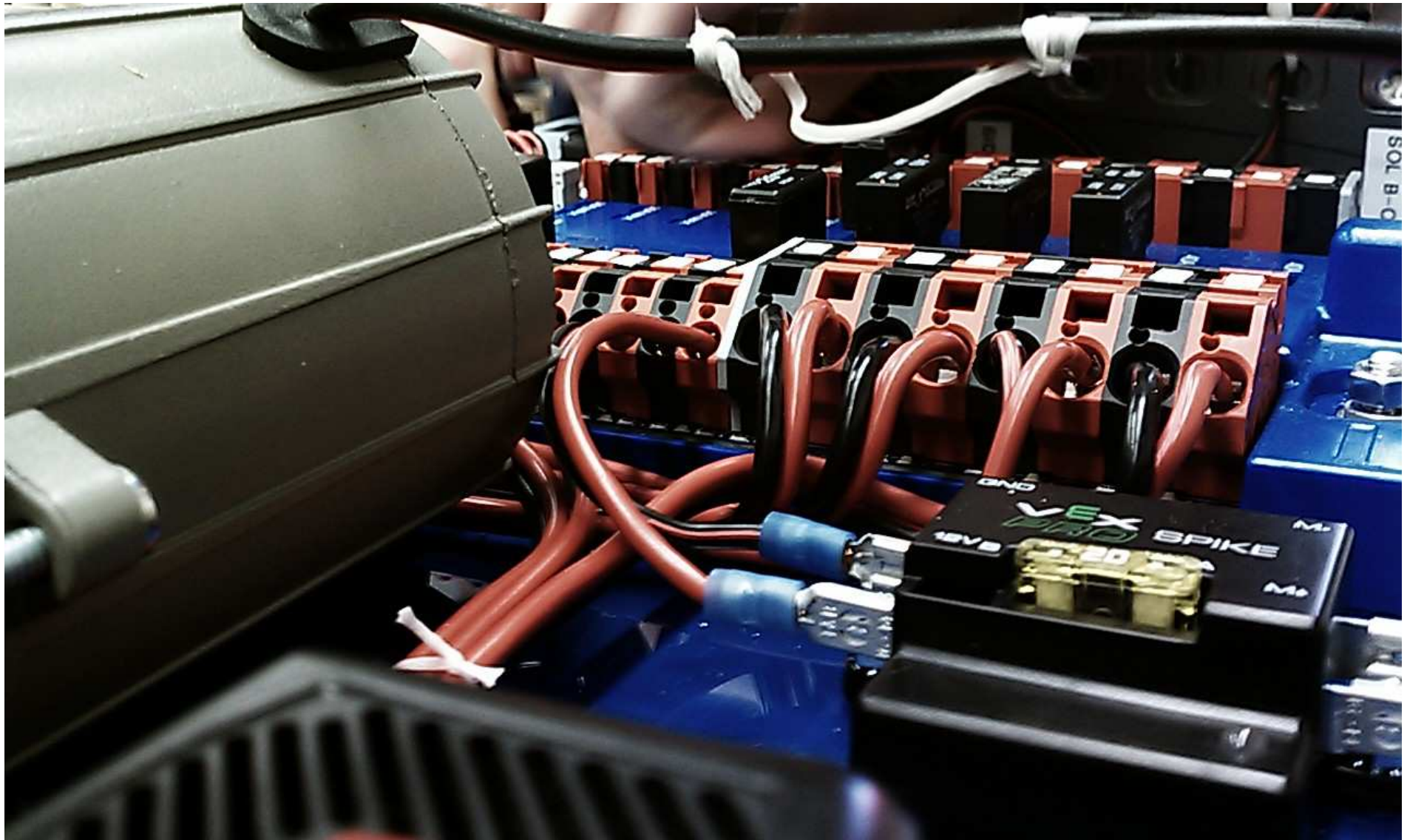
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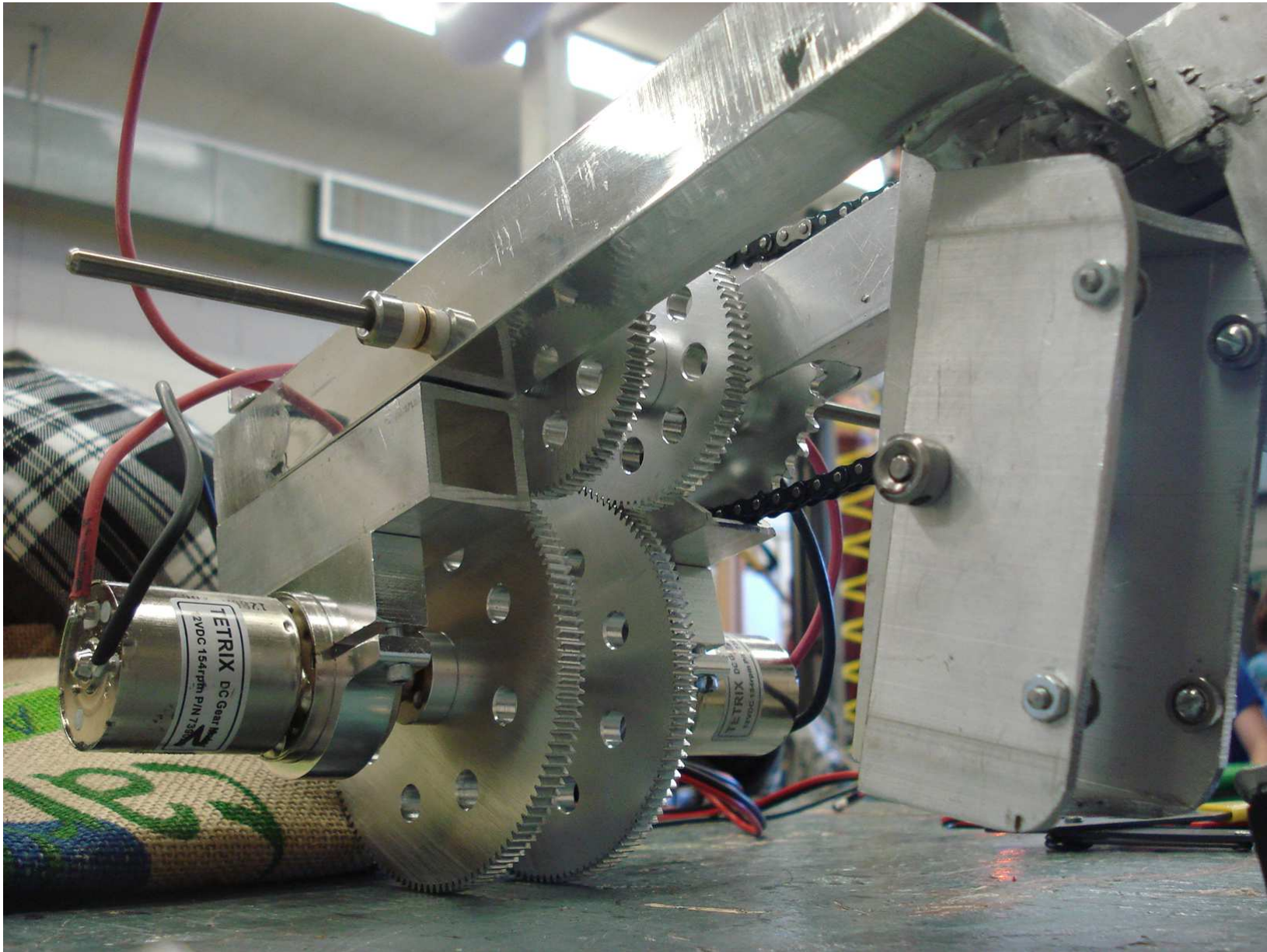
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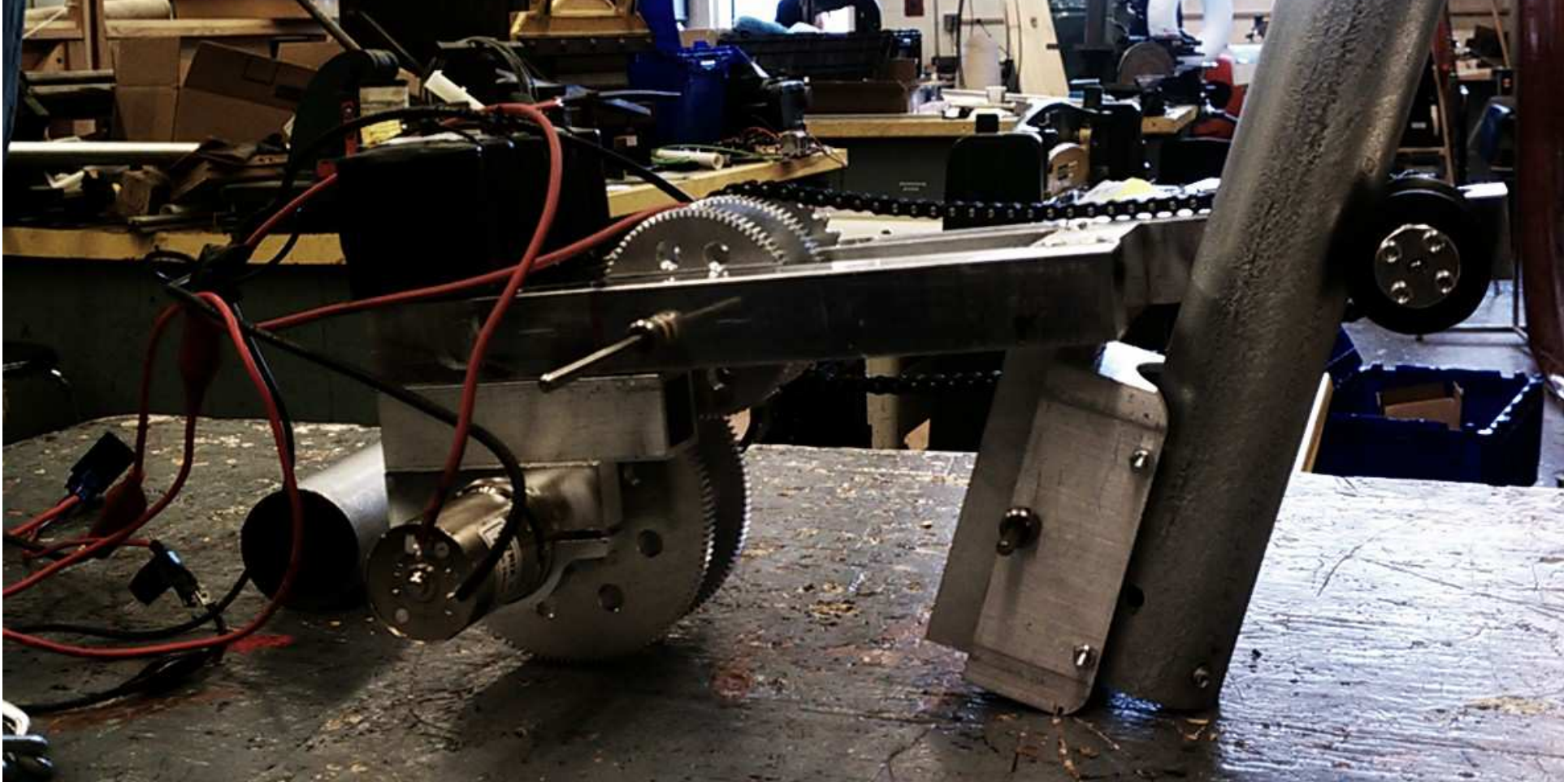
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October 2012 - Hurricane Sandy

- 25% of cell phone towers made useless





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E-APS

(Emergency Antenna Platform System)

- Deploy HF and VHF antennas within minutes
- Make use of existing infrastructure
- Bring communication to where it is needed
- Compact; no need for an antenna tower

Requirements

- Payload: 15 lbs.
- Minimum tools
- Ease of use/simplicity
- Must be fairly easy to build
- Must be safe and easy to use
- Must work on most light poles
- Low Cost

Payload

- System must be able to lift:
 - Itself
 - Antenna(s)
 - Feed line
 - Control Cable

Minimum Tools/Ease of Use

- In an emergency, time is of the essence
- Tools might not be available
- No tools necessary for deployment
 - Self contained latching mechanism

Easy to Build

- Composed mostly of off-the-shelf components:
 - 80/20 Extruded Aluminum (Erector set)
 - Automobile Window Motor
 - Automobile Hatch Struts (two 20 lb. struts)
 - Sprocket and Chain Drive System
- Tools Needed:
 - Hacksaw
 - Allen Wrench
 - Drill

Mode of Operation

- To begin operating the E-APS:
 - Unhinge the robot
 - Place over pole, and secure the latch
 - Attach antenna(s) and feed line
 - Connect cables to radio and control box
 - Raise the robot at the flip of a switch

Safety Features

- With power removed, robot stays in place
 - Clamping mechanism ensures system cannot fall outside a 3 foot radius of the pole
 - Worm drive mechanism in motor prevents back drive
 - Motor SHORT provides electrical brake

Adaptable

- Gas struts allow a wide range of pole sizes
 - Automatically accounts for pole diameter and taper
 - Pole sizes from 3 to 8 inches in diameter
- Easily adaptable to a variety of payloads:
 - WIFI
 - Cameras
 - Weather instruments

Parts List

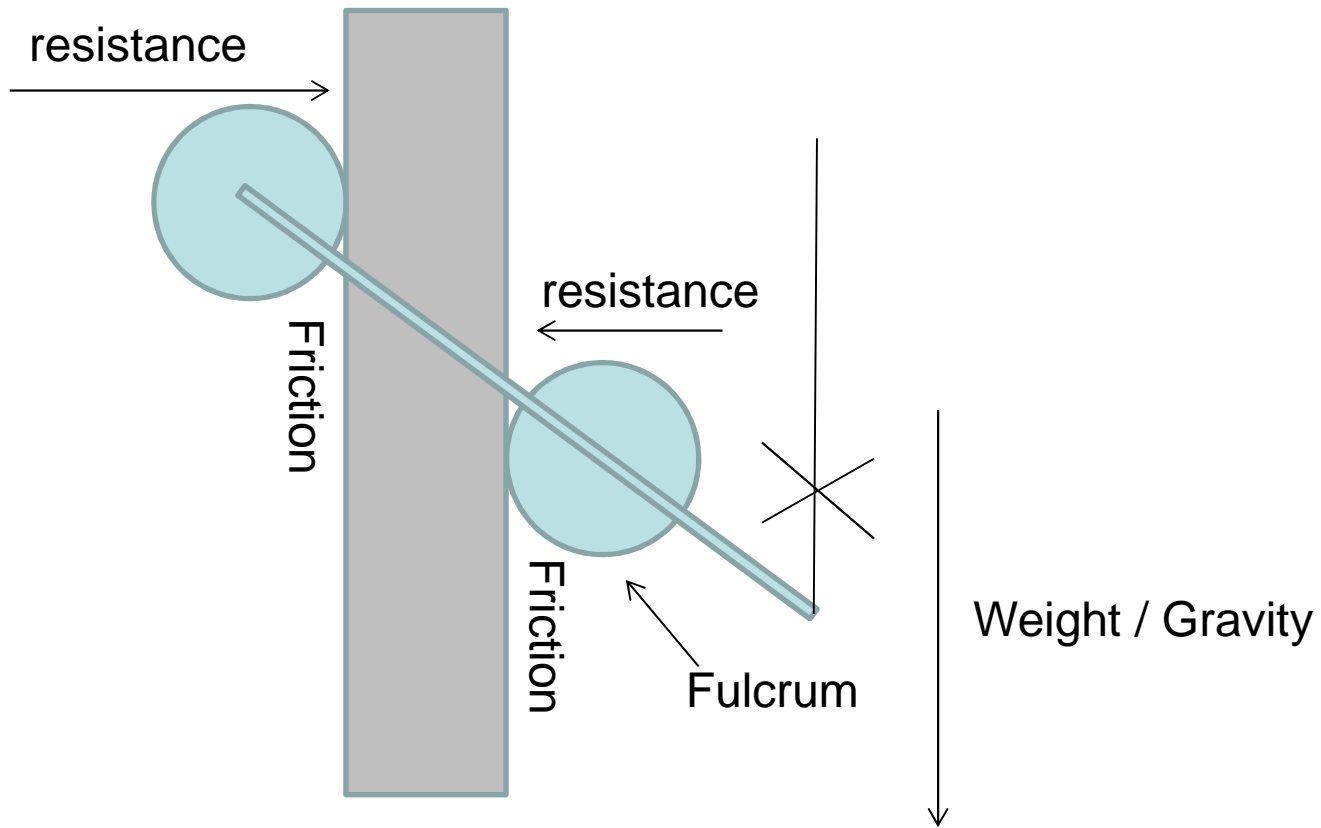
- 18' 80/20 1010 T-Slotted aluminum
- 2 80/20 Hinges
- 2 80/20 slides
- Various T-Slot connectors
- 4 4-inch thermoplastic polyurethane wheels
- ½" Drive Shaft
- #25 chain
- 3 Sprockets, 2 drive, one idler 3:2 Ratio
- Denso Window Motor
- Window Motor Drive Adapter
- 2 20lb gas struts
- 2 Locking pins

Estimated Cost \$300



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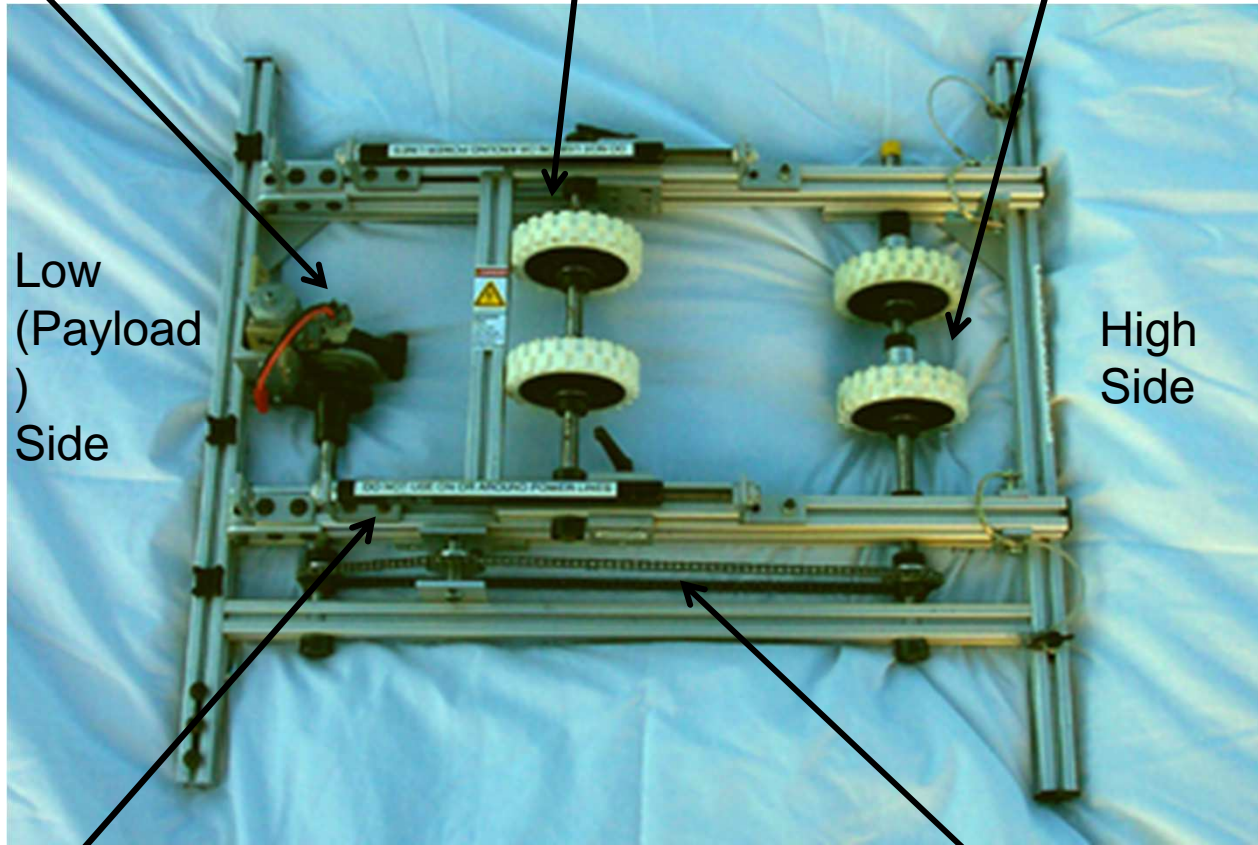




Window Motor

Sliding Wheels

Fixed Drive Wheels



Low
(Payload
)
Side

High
Side

Compression Strut

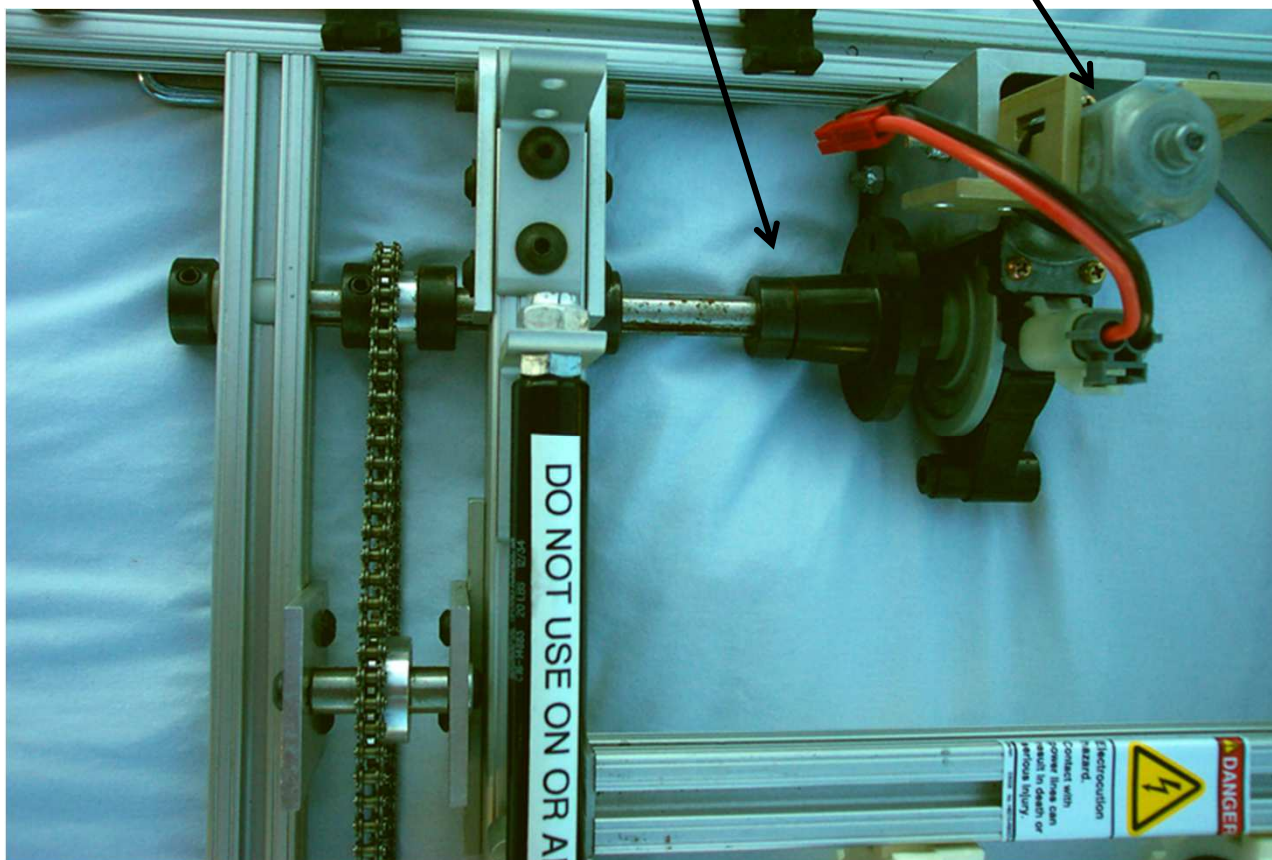
Drive
Chain

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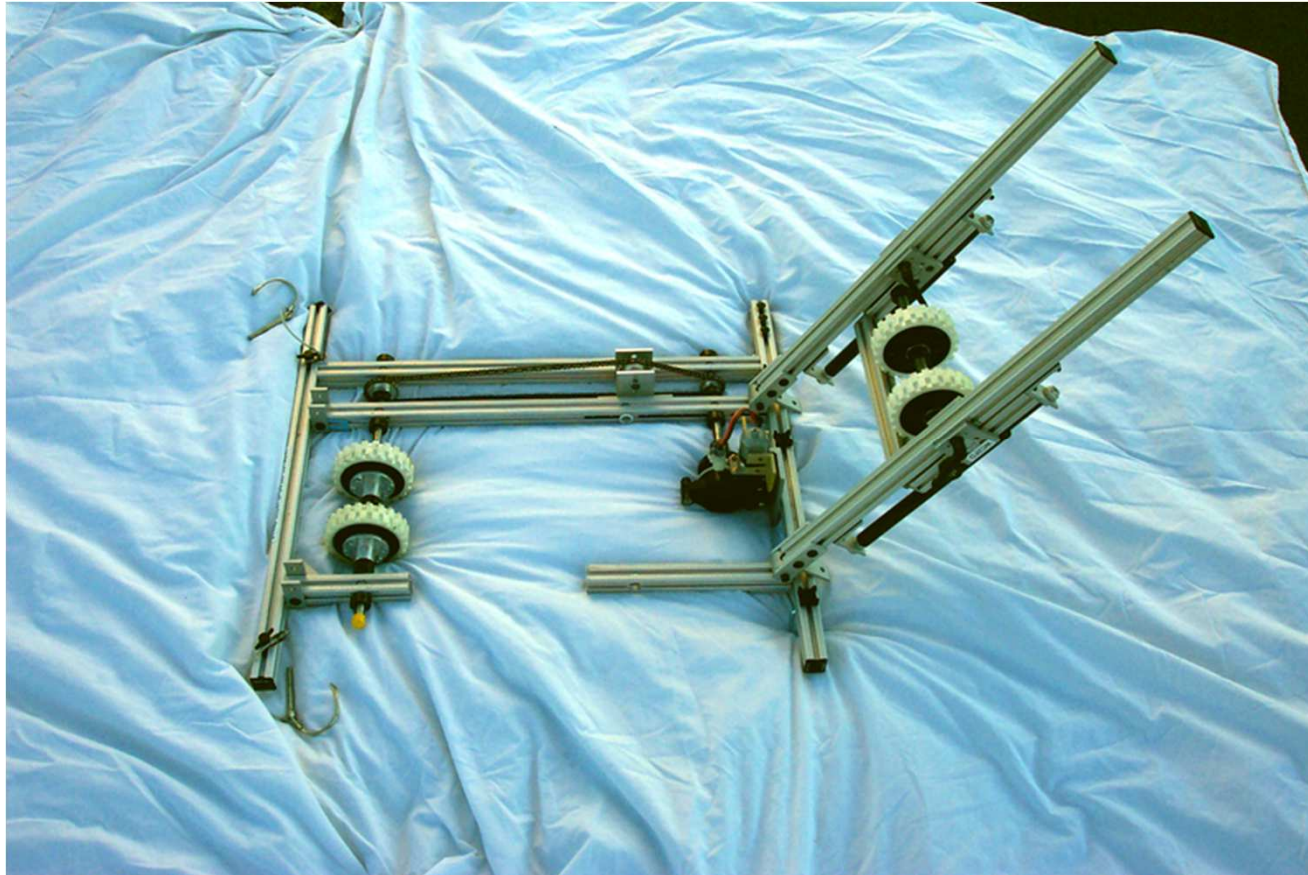


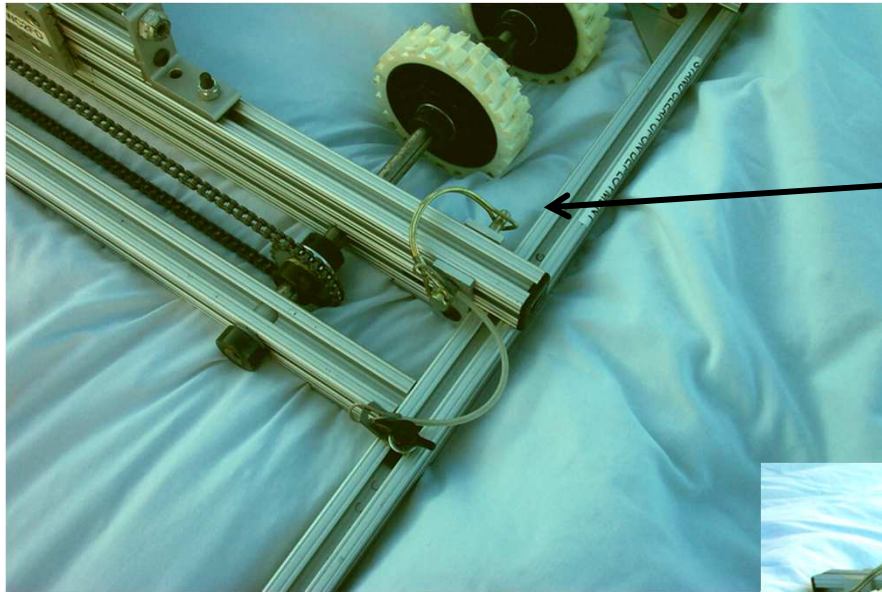
Adapter

Window Motor

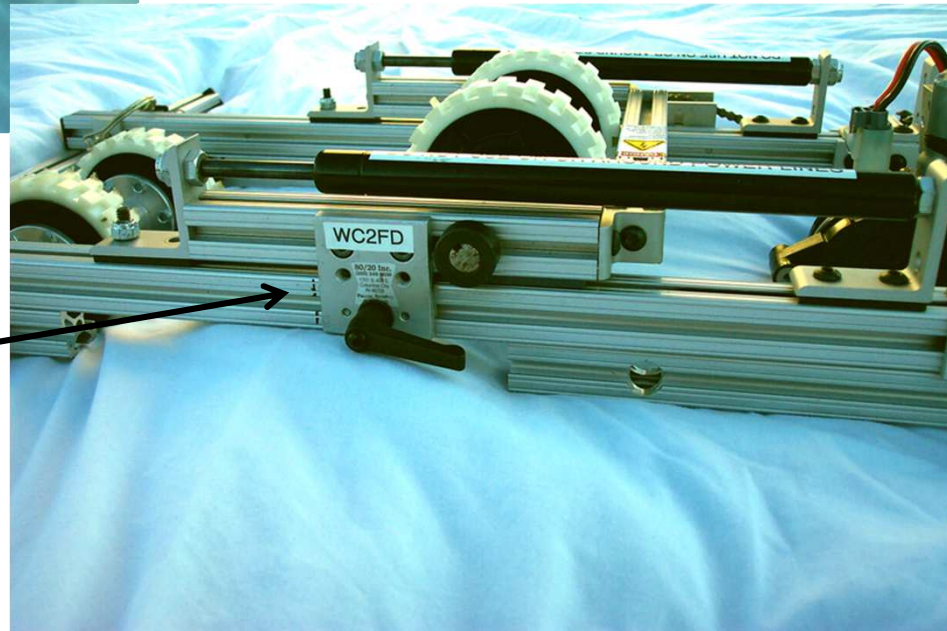


Hinged open, Locked back, Ready for placement





Locking pin for top section



Lock to hold open Slide Section

Payload Carrier Attached





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Reception

Presented at the Dayton Youth Forum



We expected this to be our only public appearance but

Reception

Sussex County, New Jersey



This is the E-APS - the Emergency Antenna Platform System. It's a robot that will serve as an emergency platform for a VHF/UHF antenna. You put the robot on a light pole in a parking lot, for instance, and then remotely control its climb until it's at the height you desire. It was designed and built by a team of young Hams from New Jersey including Devlin KC2PIX, Chris KD2CXC, Ben KD2DLM, Joe KD2CQL, Kyle KD2DWC, Gavin KD2DPN and Robert KC2WCQ. This unit is not for sale, but plans and open source programming are available to anyone who wants to build one. For more information you can go to www.wc2fd.com or e-mail for info at info@wc2fd.com. It's good to see young minds with fresh ideas doing concrete things to make Amateur Radio better; and thinking out of the box, to boot!

source: w2lj.blogspot.com

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Reception

New York Maker Faire 2013

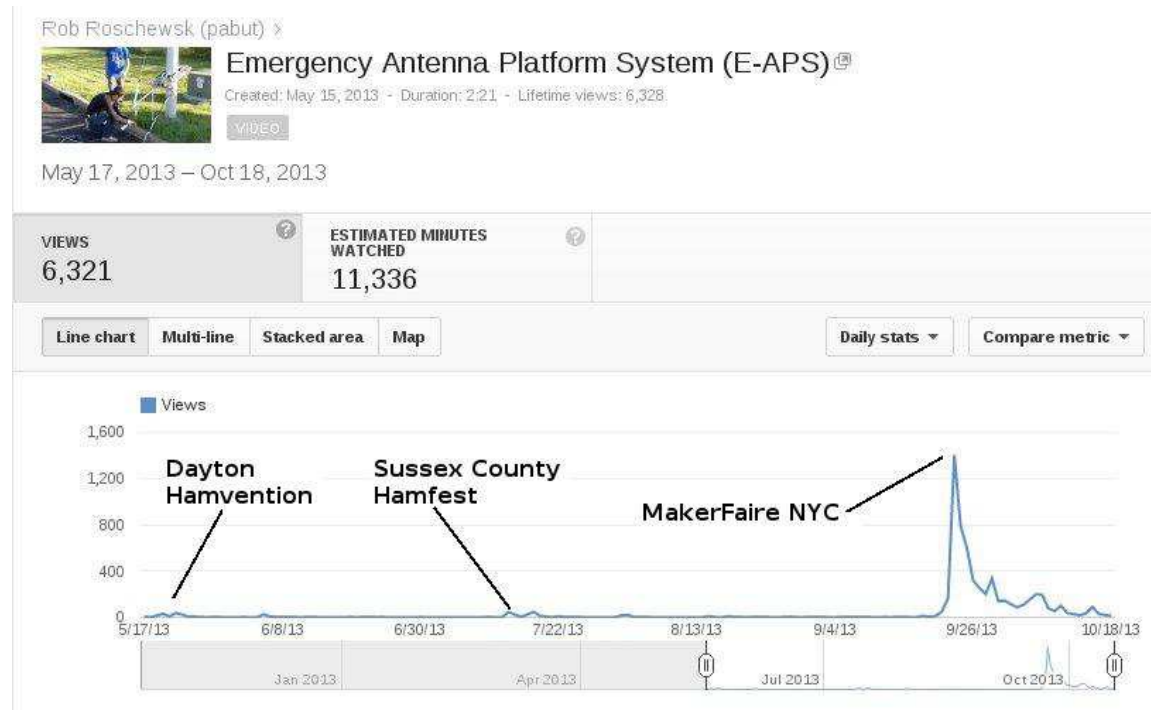
At the event we were:

- interviewed by the BBC as well as other mainstream media
- featured on the Maker Faire Live Stream
- won Maker Faire editors choice!



Reception

... after Maker Faire interest in our project skyrocketed:



Reception

- Our YouTube Videos exceeded 7,000 views
- Various independent videos taken at Maker Faire began to appear on Social Media (Facebook, Reddit, Twitter, LinkedIn, Google+, Vine)
- Our web site which normally received 2-3 hits a day was getting viewed by the 100s
- Our links were posted on Amateur Radio Forums worldwide

They
Love us
in
Poland!



The screenshot shows the Radio Giełda forum website. The header includes navigation links: HOME | QRZ.PL | FILMY VIDEO | RADIO GIEŁDA | MAPA KRÓTKOFALOWCÓW | STRONA KLUBU SP7PKI | OT PZK 03 | REGULAMIN FORUM. Below the header is a banner for "Radio Giełda" with a Facebook "Become a Fan on Facebook" button. The main content area shows a post titled "Emergency Antenna Platform System" by user "sq7mru" on 2013-09-23 18:45:11. The post includes a 5-star rating, a group name "Użytkownik", QTH "JO91VR", and statistics: "Posty: 543 #1606896" and "Od: 2010-9-30". The post content contains two links: http://wc2fd.com/index.php?title=Emergency_Antenna_Platform_System and <http://sq7mru.blogspot.com/>, along with a link to a QSL downloader: <http://tinyurl.com/eQSLDownloader>.

Reception

At Dayton especially, spectators were fascinated by the concept that we were making the plans OPEN SOURCE and not selling it.

We were happy to interact and explain the project without trying to “sell it.”

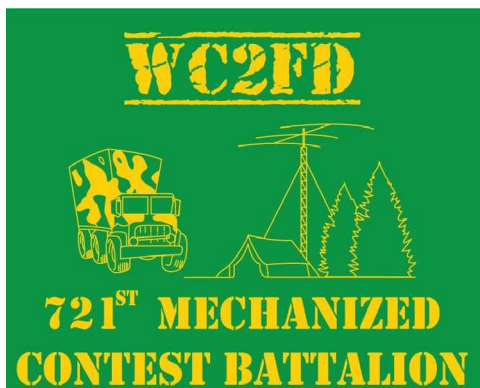
It's been a Fun Year!

- ✓ Dayton Youth Forum
- ✓ Sussex Hamfest
- ✓ Maker Faire
- ✓ RCA Technical Symposium

We started this all with the help of Carole Perry ... it seems right to end it with her as well. Thank You!

... and now we want to try
something new!

- Youth Team Members:
 - Chris Blackwood KD2CXC
 - Benjamin Boniface
KD2DLM
 - Gavin DeAngelis KD2DPN
 - Robert Mohr KC2WCQ
 - Devlin Murray KC2PIX
 - Joseph Waldinger
KD2CQL
 - Kyle Watt KD2DWC



- Adult Team Members:
 - Nick Mohr KC2VWI
 - Kevin Murray K2FN
 - Rob Roschewsk KA2PBT
- Technical Support
 - Tom Janecko KC2HDN
 - David Rader
- Special Thanks
 - Carole Perry
WB2MGP
 - FIRST, usfirst.org