Intro
- Show of hands, who goes racing to stand around and wait? Right, no one
- One of the most frustrating and time-consuming problems that can happen at an event is a timing failure
- When I started RallyCrossing with Susquehanna region in 2013, we had a pair of hand-me-down Tag Heuer timers that were more solder than circuit board, nearly all of our other equipment was borrowed, and we were plagued with timing issues.
- Timing is the third most important element of the day, following safety, and having fun with cars. Test & Tunes are fun but it is a competition sport after all

Why Am I Sitting Here?
- Hopefully, you're here to answer some questions and avoid a situation like we see here
- Approximately 37% of regions currently have some form of Rallycross program and another 29% are working towards launching a program
- Complete timing systems can be a cost constraint for regions trying to start or run a RX program on a budget
- Timing does not need to be complicated or expensive; remember, cumulative times in RX so precision is less critical
- The timing solution needs to work for your region's situation and budget
- This is NOT a training course on how to run timing
- This IS intended to provide an overview of available options to implement a new system from scratch or improve an existing timing system

What are my options? – Timing Systems
- A good timing system needs three components: Sensor, Hardware, and Software
- These components work together to record an accurate time(s) from Pt A to Pt B
- Different components from each category can assembled to create a complete timing solution

  - Sensor – provides a signal to the hardware system
    - Visual
      - Choose a fixed point (double uprights work well) to start and stop timers. Give a rolling start and start/stop while the car is moving!
    - Photo Eye / Through Beam
      - Usually supplied with the timer hardware
      - May have problems with RX environment (dust, rain, mud, direct sunlight, etc.)
      - Small fans can be used to push dust away from the beam
    - Pneumatic sensors
      - Can be built for reasonable cost, gate switches/pressure sensors
      - Generally unaffected by weather conditions
      - Low profile, tripods not necessary
      - Hoses can be damaged by lowered cars or sharp rocks
      - Require more maintenance (replacing hoses/clamps)

- Our Pneumatic Sensor Kit
  - Everything in one Rubbermaid tote
  - Tarp straps are used to maintain tension on the hoses
  - Hammer, spikes, and spare hose clamps in each tote

- Hardware – processes the signals from the sensor into a time
  - Stopwatches: $15-100
    - Economical and nearly bulletproof
    - Least cars on course at once
    - Change batteries before each event if possible
  - FarmTek: $1200-3000
    - Most inexpensive bundled timing system
    - Does not work with pneumatic triggers
    - Wireless
    - Battery powered
  - RaceAmerica: $3000-6000
    - Can be wired or wireless
    - Works well with pneumatic triggers
    - Requires external power source (12V or 120V)

- Software – records the times and penalties
  - Paper
    - Least likelihood of failure but human error is more likely
    - Takes the longest to record times
    - Waterproof paper can be useful
  - Excel
    - Short learning curve
    - Still entails manual entry of both times and penalties
    - Requires computer
  - Dedicated timing software systems
    - AXWare/AXTime/Pronto
    - Longest learning curve
    - All have an associated cost and require a computer
    - Ability to import registration files
    - Automated entry of times from hardware
    - Easiest output of final scoring
    - Find out what nearby regions are using, helps find timing operators without retraining

What Does Susquehanna Do Now?

- Race America wireless & AXware & pneumatics & live timing
  - Requires additional equipment
    - Generator
    - Computer
    - Wifi hotspot
    - Tent
  - Best solution for our region, might not be the best for yours
  - Redundant system duplicates our AX system and operator crossover
- Continuous improvement
  - Redesigned pneumatic sensors
  - Simplifying computer setup – desktop to laptop
  - Considering solar power vs. generator
  - Investigating how to implement an RFID system for timing in the future

Where do I start? - Best Practices

- Redundancy
  - 2 stopwatches
  - Backup timers and triggers (stopwatches, extra photo eyes, extra tubing)
  - Change/charge batteries before every event (same for radios)
  - Use audit sheets, one of the best improvements we ever made
- Timing Operator Focus
  - 1 on computer, 1 on radio and audit
  - Nobody talks to timing, all inquiries go through Chief/Stage Captain
- Line-Of-Sight
  - Set up timing in line-of-sight to start (and finish if possible)
  - Eliminates need to call car numbers over radio
- Dual Channels
  - Corners on CH1, Operations (SS, Chiefs) on CH2
  - Requires extra radios for operations or radios with scanning capability
- Radio Etiquette - for course workers
  - Wait for loud cars to pass
  - Don't call on the radio and run for cones at the same time
  - Mono-syllabic calls, always separate numbers with a word
    - E.G. – "Corner 3, Car 415, Plus 2"
    - As opposed to "Timing this is corner 3, 2 cones on car 415."
  - Keep chatter to an absolute minimum

How Do Other Regions Do It? - Open Discussion

- What systems have other regions used with success?
- What solutions haven't worked as well?
- What are some of the best practices used by your region?

Closing

- Don't overcomplicate your timing solution
- Do what works best for your program
- Always have a backup plan
- Be creative and innovate

Thank you and please remember to rate this session on the app