

Build a Mesh Mobile Tower Fleet



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Volunteer Medical Communications Coordinator,
Medtronic Twin Cities Marathon

Red White and Boom Half Marathon

Loppet City of Lakes Winter Festival

<http://www.14567.org>

Medtronic Twin Cities Marathon Medical Communications

110 Yellow shirts (hams) backstop 911 /EMS medical communications and dispatch volunteer resources and track injured runners

Injured /dropped out runner location data flows to the server and status dashboard

Course tactical operations are autonomous (ICS)

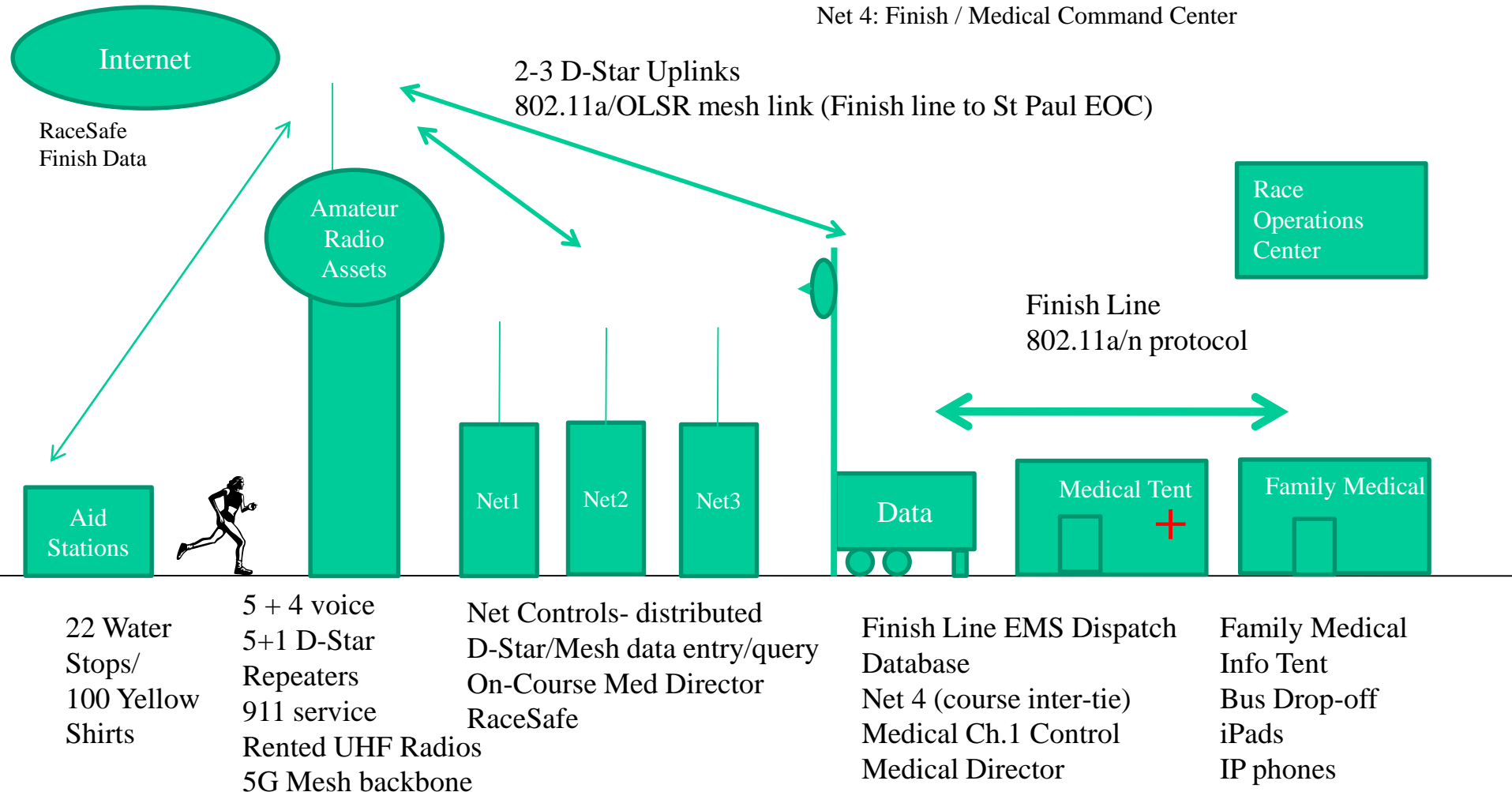
“Runner Down” protocol is always 911

Net 1: (Miles 1-18) Minneapolis (Maple Grove Fire)

Net 2: (Miles 18-22) Hennepin County ICC Truck (ARMER)

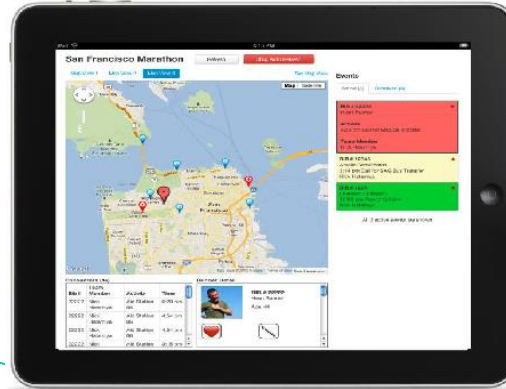
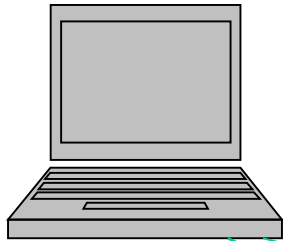
Net 3: (Miles 23-26) St. Paul Dispatch Center (911)

Net 4: Finish / Medical Command Center

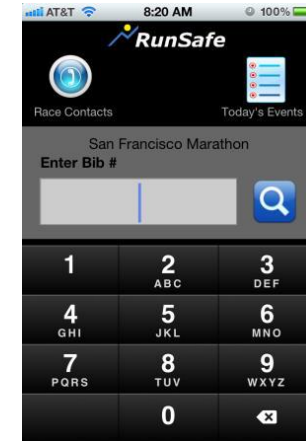


RaceSafe Commercial Software

Command centers
Query + updates



MDs
Medical
admissions



Mobile
devices

TCM Race
Timing Web

trivnetdb in
the TCM
data trailer

API

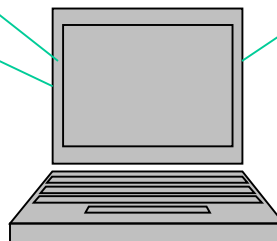
irunsafe.com

EMR
PHR
data

Events +
Timestamps

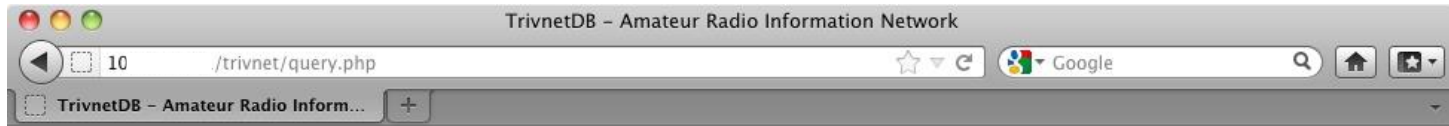
Part 97 Requirements:
Non HIPAA event view,
API feed to trivnetdb

Either a single
integrated
view or windows to both/all apps



Amateur Family Medical
Information Tent agents (6-8)

Our Open Source Tracking Software: Trivnetdb



TRIVNETDB - Amateur Radio Information Network

[Home](#) [Search](#) [Multi-Edit](#) [Batch Edit](#) [Messaging](#) [Admin](#)

Last Name:

First Name:

Bib Number:

Gender:

Race Entered:

Age:

Middle Initial:

Match all (AND search) Match any (OR search)

or by status message:



Missing /dropped out/ill runner
web runner lookup and update

0 rows

Last Name:

First Name:

Bib Number:

Gender:

Race Entered:

Age:

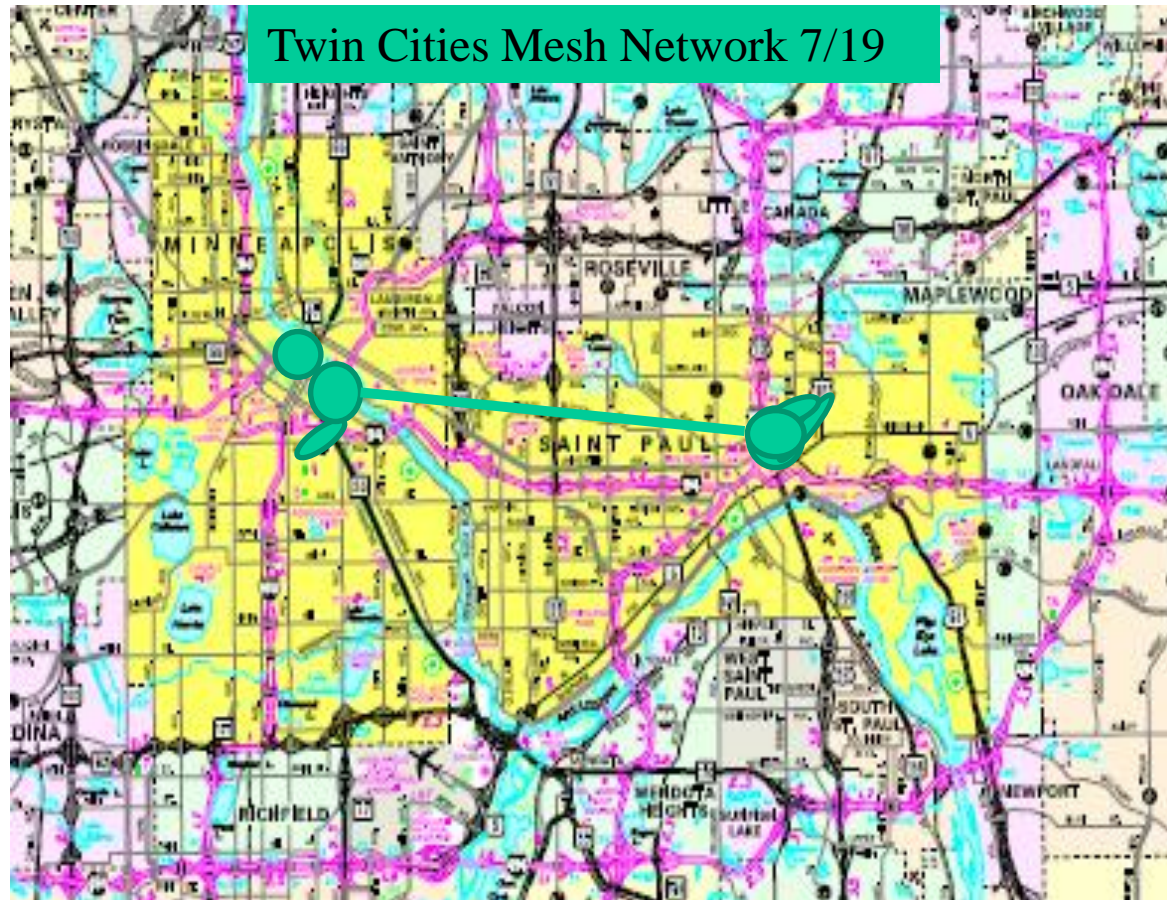
Middle Initial:

Match all (AND search) Match any (OR search)

or by status message:

Runner location only- non
HIPAA
Can be used for family
reunification, vaccine stations

5Ghz Mesh High Speed Part 15* “TWINSLAN Medical Command Network”



In production for live video, dashboard apps, voice and family reunification
Encryption is supported for medical records, law enforcement as needed

* Caused the “Revolt of the COMLs”

2/20 City of Lakes Loppet Winter Festival



Urban ski race- five distributed aid stations
Super volunteer friendly
42 KM course
HQ located in a valley
Needed a tower trailer – none was available

2/2020 Broken “Light Tower” Trailer found online* - \$700



1.0 Vision

30' tower (crank up)

Group 27 deep cycle

50w solar panel

TWINSLAN mesh

2.4 Wifi

GP95 2m/440/1.2

Spare antenna mounts

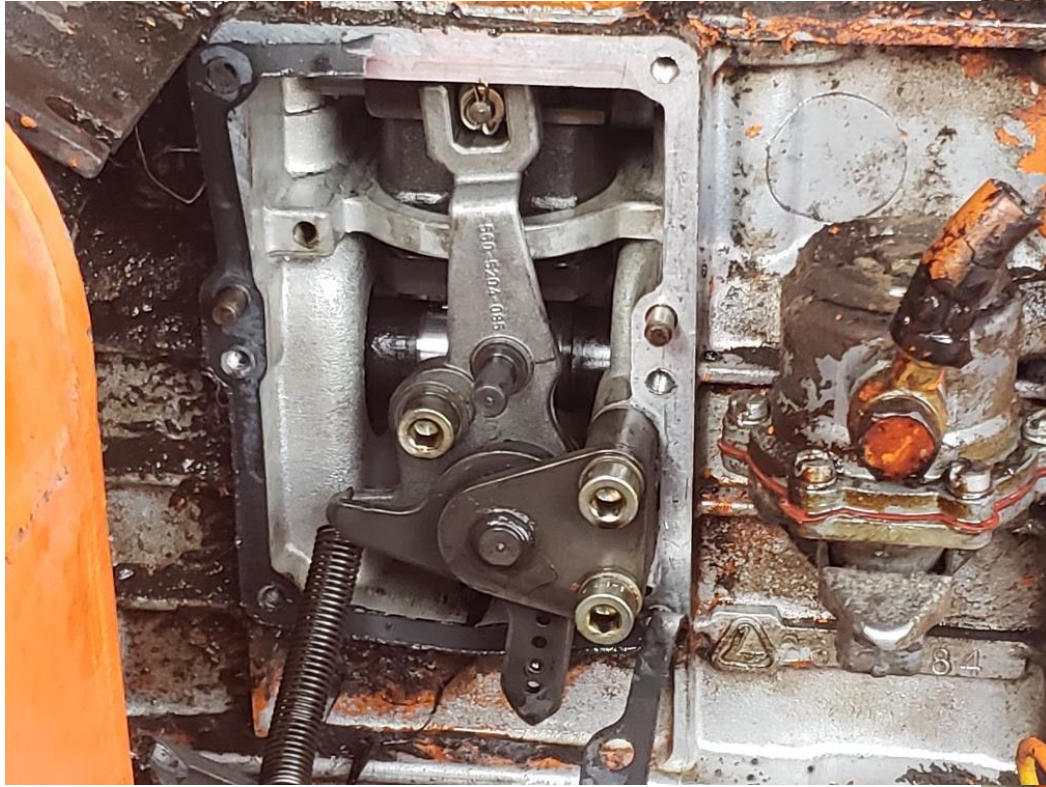
6KW diesel (soon)

Bent axle

Consultant: NONAS

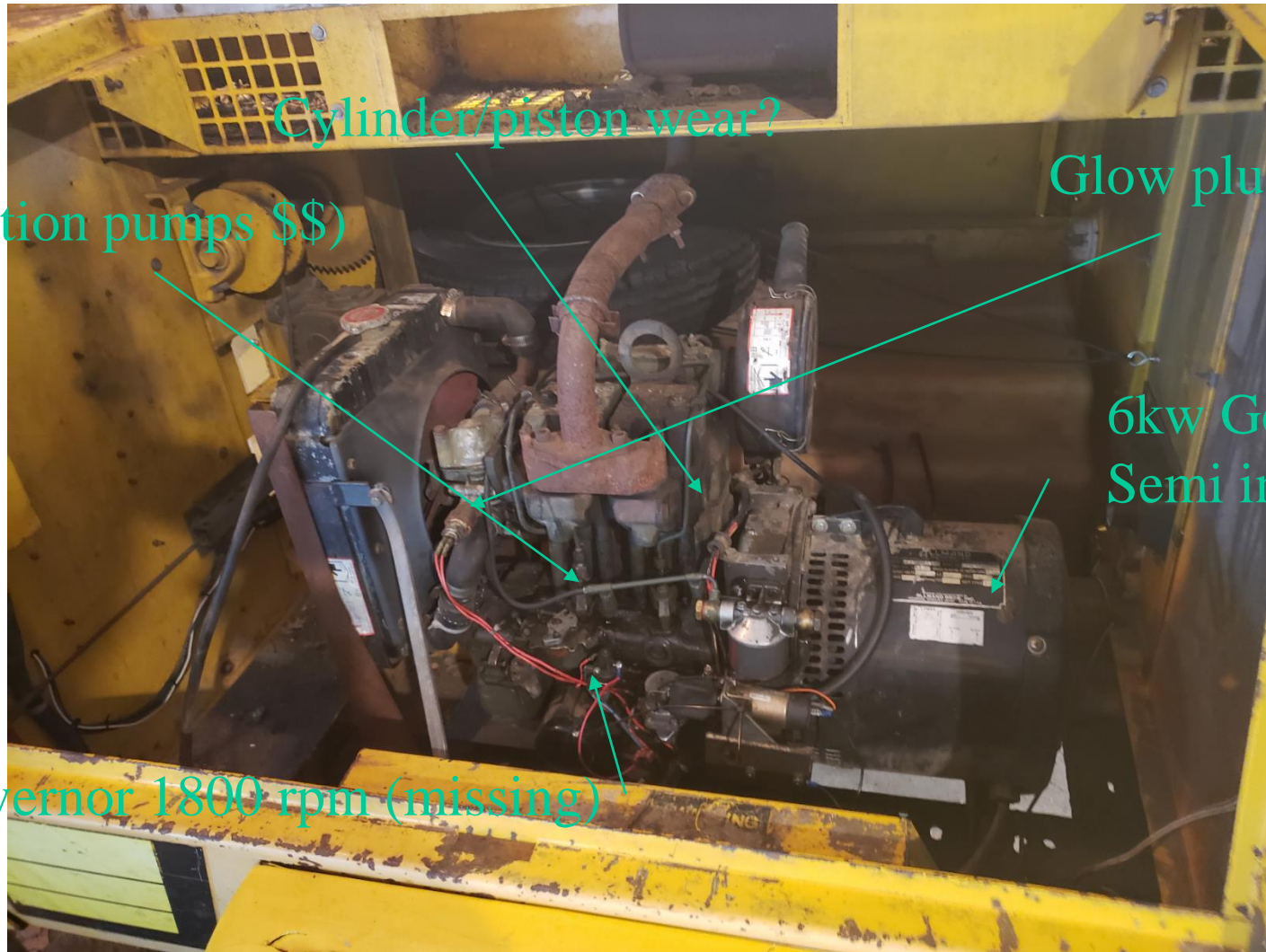
*The largest supply/wholesale/surplus market for light towers is on www.ironplanet.com

Engine Trouble? – Yes



Decisions -\$700 Broken or \$1500 Running?

This diesel is a Lister-Petter LPW4 (also military)



Injection pumps \$\$)

Cylinder/piston wear?

Glow plugs

6kw Generator –
Semi interchangeable

Governor 1800 rpm (missing)

Tires, bearings, lift cables and jacks

Field Day 2020



6M beam, propane generator, dipoles, mesh

G5RV



Ta33jr, dipole support

“A broken generator is good ballast”

Hams in the Park - #2, #1 & #4 “Rock”



Driveway storage tip: "is that a BBQ smoker?" – yes

Was orange now black #1 (L) Jolly Green Generator #8 (R)



5G Part 15
Mesh

5G AREDN*

PTZ Camera

2x100K Lumens

3kw propane

Pipe mount

2G Mesh

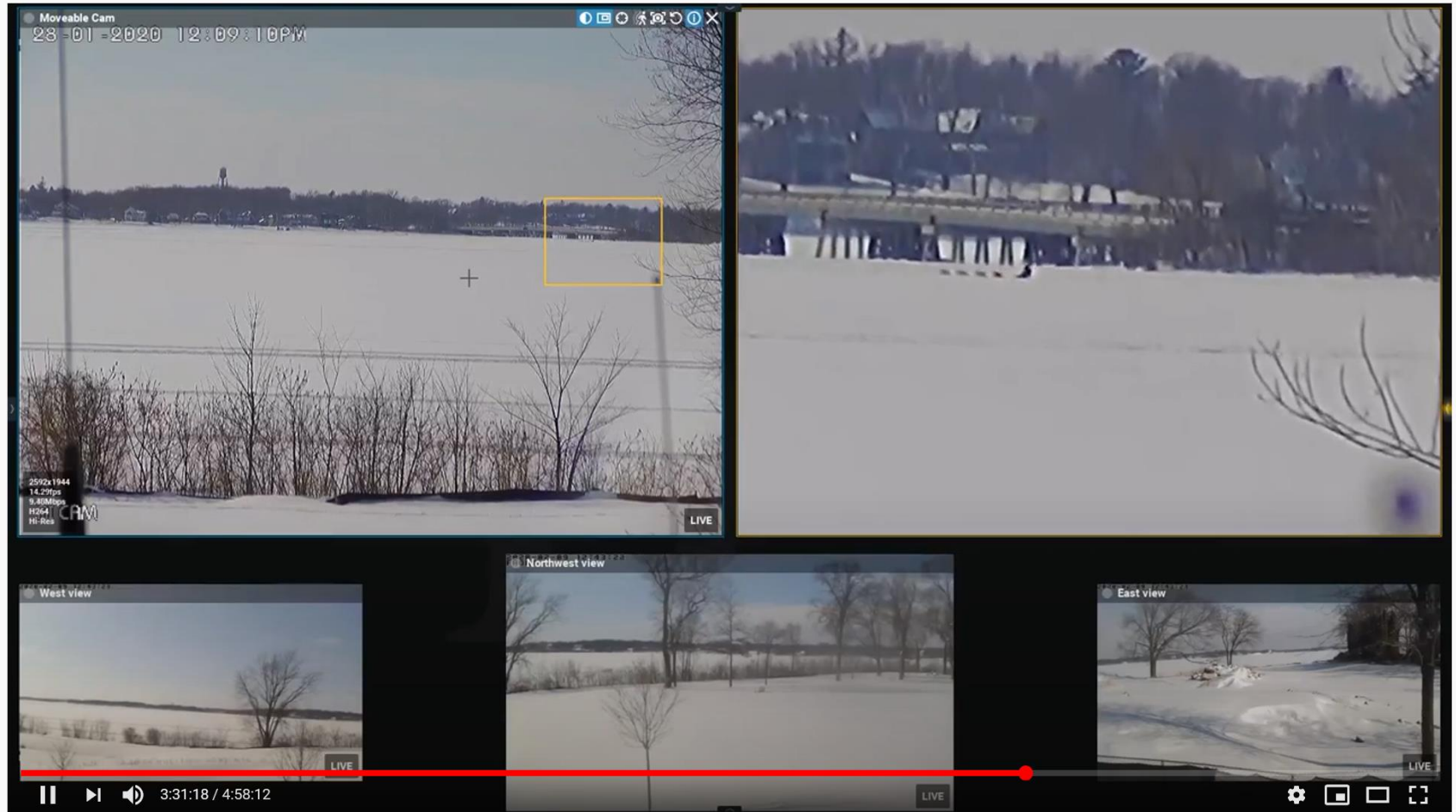
6KW Diesel

* Solved the "Revolt of the COMLs"- power only air-gapped

7/20

Snazzy Decals

Mesh Video Aggregation from Command Truck, 15,000 acre lake



Klondike Dog Derby - ICC Brackett's Point

Unlisted

29 views • Streamed live on Feb 9, 2020

LIKE DISLIKE SHARE SAVE ...

Proposed Silly* Trailer Rules

- Trailers get cute tactical names/colors (ask your wife)- consult your kids on the paint job
- Trailers are tested with our Strategic Technology Reserve assets and local mesh standards. We hand out radios and antennas for this. If everyone sets them up their own way they cannot work together or add value.
- The ownership should be widely distributed to prevent any one person from taking them over.
- Ideally we have a three hour response time state wide. My two are plugged in on 20 minute warm standby. Four hours to find which box in the basement has the antennas and which bin has the feedlines is not good.
- Trailers should travel in convoy for the best visual effect. I can see these in parades, county fairs, etc.
- Citizen Science is the idea here- creative technology is encouraged- this is a technology/service/hobby project. Remember "State of the Radio Art" from someplace?
- If more than one trailer is needed at once - ask- "Barn Raising" is the model
- These are intended to be cheap and abundant - more like cattle vs a prized race horse. If you have \$10,000 in it or it is powering your house it can't be out helping others.
- We found epic callsign decals <https://www.ebay.com/itm/123054221928> the idea is we are volunteer Ham Radio operators - think bass boat armada for water rescues.

Thanks to N0NAS and KD8GBL for advice and support

*Every effort is being made to not take this effort too seriously. A beverage cooler was a suggested add-on.

Amateur Radio Public Service in 2020

- Is waiting around for government radio systems to fail boring?
- Embedded in agencies- EMS, hospitals, counties, NGOs
- Capabilities + direct service
 - Missing persons
 - Aid stations /medical support/ medical command centers
 - Family reunification
 - Weather spotting
 - Video
 - Duties as assigned (food distribution, IT support etc.)
- Assets*- repeaters, networks, generators and tower trailers
- A Ham Radio license is a valid credential
- “Unwanted Volunteers” are prized, trusted and recruited

*(Go-kits are not welcome at large sporting events)

Proposed Engagement and Maturity Models

I have been working with K8JK on a maturity model for the delivery of volunteer emergency services via Amateur Radio. These models are common in technology, and can be applied to us. The idea is you move up on the list over time following best practice.

- Integrated volunteer emergency management*
- Family reunification /volunteer medical management
- Interoperable communications /backup EOC
- Amateur Radio traffic handling /shadows
- Backup communications

And an agile engagement model:

- Understand served agency needs
- Model needed processes with embedded volunteers
- Execute flawlessly
- Measure results and improve

*Good tests here: If you are recruiting medical providers and your event is recruiting hams, and if they bring you coffee vs you bring them coffee