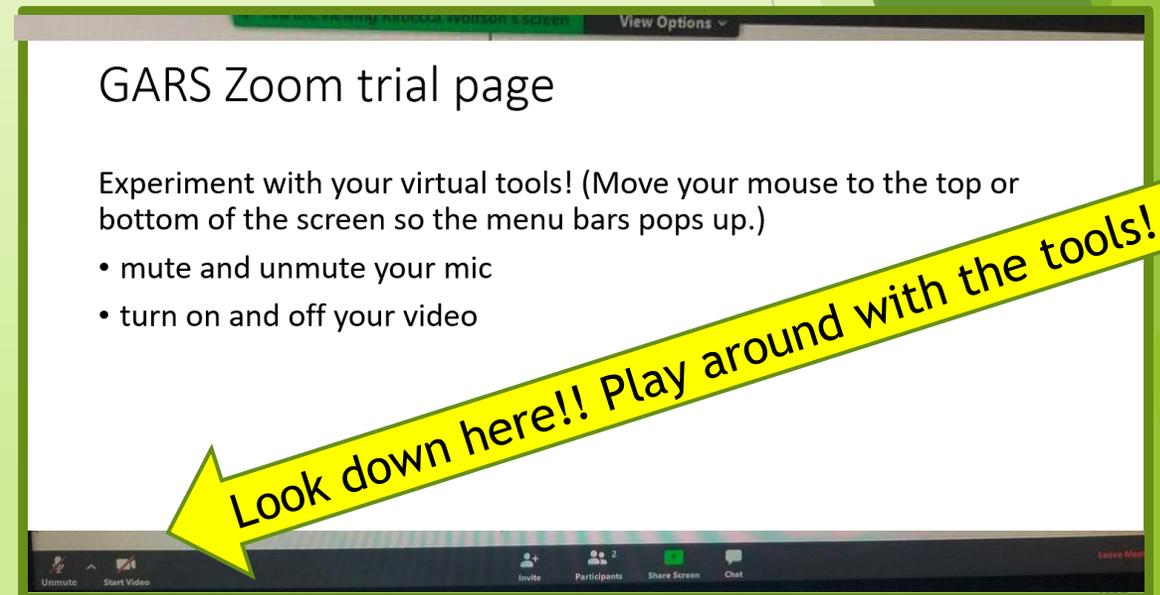


# GARS: Learn to use Zoom. “Time to Play”

Experiment with your virtual tools! *(Move your mouse to the top or bottom of the screen so the menu bars pops up.)*

- ▶ mute and unmute your mic
- ▶ turn on and off your video
- ▶ Can you find the group chat?
- ▶ Did you login with your first and last name?
  - ▶ Go to the participant list, right click on your name
  - ▶ For fun, add in your call sign!!

Open up the chat box to see what people are typing.





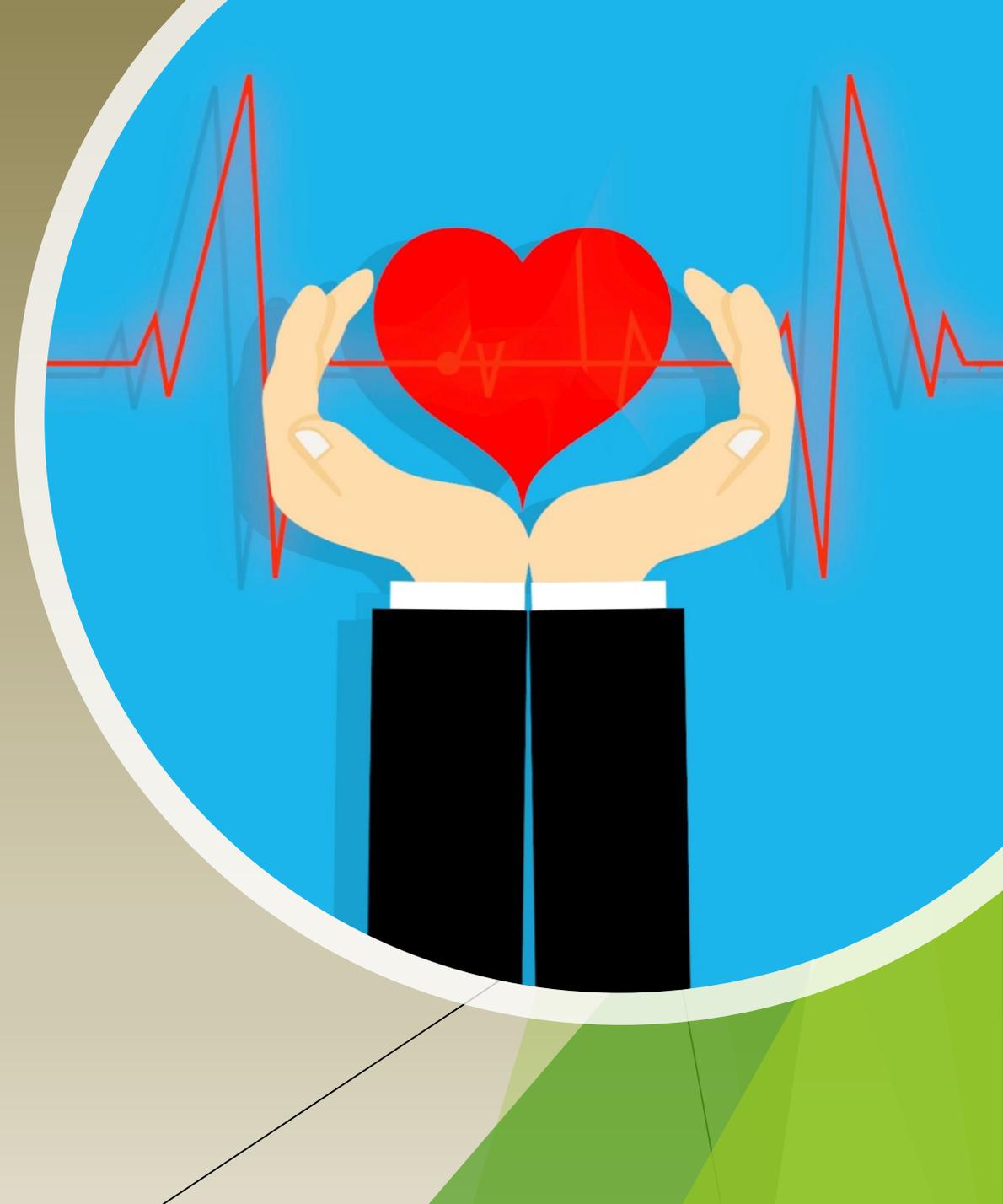
# Opening Items

- ▶ Call to order
- ▶ Pledge of Allegiance



# Sickness and Health.

- ▶ Carol Chesney's mom is currently at Shands with a broken pelvis.
- ▶ Larry Rovak's son. Larry is now restricted to FL. NJ has been hit very hard with the virus.
- ▶ Gary's daughter SueAnn Hunt passed away due to cancer (Used to be a GARS member)
- ▶ Hal Helm and Fae, Fae has breast cancer, doing aggressive radiation/chemo treatment. Things are improving, he thinks. (Used to be a GARS member)
- ▶ Helkie might go home to Daytona Beach when he is able. Frequent and reliable in public service. We should do something for him. Need contact information.



# Officer Reports:

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- ▶ GARS Secretary
  - ▶ Treasurer
  - ▶ Ares Secretary
  - ▶ Webmaster
  - ▶ VP& Repeater trustee
  - ▶ President Repot
- 



# Officer Reports: **GARS Secretary** **Rebecca Wolfson**

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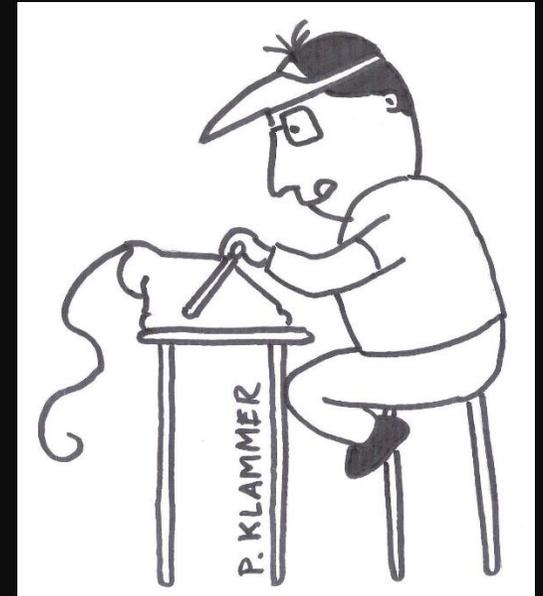
- ▶ Zoom comments
  
- ▶ Attendance will be taken from the participant list.



# Officer Reports: Treasurer Pete Winters

## GARS Treasurers Report February, 2020

Date	Amount	Description
2/6	(\$72.49)	Debit Withdrawal - ATT Phone Bill
2/14	\$90.00	Deposit - Dues
2/18	\$90.68	Deposit - PayPal - 2020 Dues
2/19	\$9.77	Deposit Amazon Smile
2/28	(\$300.00)	Debit Withdrawal - Risk Strategies -Annual General Liability Ins Premium
<hr/>		
	\$190.45	Total Income
	(\$372.49)	Total Expenses
	(\$182.04)	Net Decrease



Balances	Current 2/29/20	Prev. Month 1/31/20	Prev. Year 2/28/19	Annual Change
Checkbook Balance	\$1,343.68	\$1,525.72	\$1,250.07	\$93.61
Outstanding Checks	-	-	-	
Checkbook + outstanding	\$1,343.68	\$1,525.72	\$1,250.07	\$93.61
Savings	\$8,064.96	\$8,064.64	\$7,119.81	\$945.15
Total	\$9,408.64	\$9,590.36	\$8,369.88	\$1,038.76

### Outstanding Checks

Ck #	Amount
Total	\$0.00

### Balance Per Bank Statement Dated 2/29/2020

Checking	\$1,343.68
Savings	\$8,064.96

# Officer Reports: **ARES** Emergency Coordination

## **Jeff Capehart**

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\* 2020 Florida EmComm Conference & Exercise success (3rd Annual)

EC-001 Course: 14 attended the class; 5 passed the exam.

Gordon KX4Z is now an evaluator for the Florida ARES Task Book.

(Working certifying 2 or 3 more people).

Gordon & Leland attended "Volunteer Florida Conference", March 3-4: taught to use new equipment in DOE, FEMA Region 4; FL Emerg Dept/liason worked with Leland and Gordon. Lots of Interaction with emergency people in government. Go to website to participate.

A trailer was assembled by members in February @ Gordon's (future Tower trailer).

Next Meeting 7pm Wed., March 11, 2020 @ Red Cross

\* Florida ARES Forum: Fort Walton Beach Ham fest, Saturday 3/21/2020

# Officer Reports: **ARES Secretary** **Jeff Capehart**

**\*2020 Florida EmComm Conference & Exercise a success**

**Exercise--7 deployment locations (Teams of 6) with 4 EM/EOC staff and Gordon as Exercise Controller. Duration was 3 hours.**

**Excellent relationship building with our emergency manager and his staff. ARES is in good stead with him.**

- ▶ Implications; impressing officials in government
- ▶ Suggestions for improvements for EOC during activations.
- ▶ Successful use of HT on 2 meter HTs and the Gainesville Repeater.)



# Officer Reports: **ARES Secretary** **Jeff Capehart**

**\*"Volunteer Florida Conference 2020" by Volunteer Florida**

- ▶ **Define:** a state-chartered agency that interfaces between voluntary organizations active in disasters and the state.
- ▶ **History:** It was spun off from FL department of Emergency Management
- ▶ **Purpose:** to understand how to fit Alachua ARES might better fit in as a volunteer organization into the bigger support picture.

**Dr. Gibby and Leland Gallup attended Tuesday afternoon and Wednesday morning in Orlando**

**\*\*Some amateur radio operators from elsewhere in the state were also present.**

**Presentations by: 1. State of Florida's VF mass care (ESF 6) liaison**

**2. FEMA rep, responsible for ESF 15 (the liaison with volunteer organizations).**

**Conclusion: Both Gordon and Leland found it to be a useful conference,**

**learned about the VF structure, and volunteer organizations active in disasters in general,**

**they also made some connections with other amateur radio operators in the state.**

**Finance conference Friday / Antenna creation at park on Saturday**

# Additional ARES Business - Gordon Gibby

- ▶ Conference Baptist group
- ▶ Duration: 4 ½ hours
- ▶ Satellite system: ran Internet
- ▶ SHARES net, use of slingshot antenna etc.
- ▶ Highly advanced tech equipment requiring training for hams
- ▶ The hams showed participants how to use HTs, repeater etc.
- ▶ Note: Transmitter and receiver must be on for transmission to occur!! LOL



Gainesville Amateur Radio Society



# Officer Reports: **Webmaster**

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Notes: <http://gars.club>

Joint effort (Vann and Carol Chesney) with updating website

Ham fest and ant crawl have been updated

Contact webmaster via email for additional changes if needed.

# Officer Reports: VP& Repeater trustee Shannon Boal

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Repeater trustee report:  
All machines, including SARnet, are working,  
no issues with hardware.

A need has arisen to post announcements on the 146.820.  
(Announcements like this were done for the hamfest years  
ago by John Warne, Ray Forrester, and Scott X.)  
It is desirable to have this in place for emergency preparedness.

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# Officer Reports: President John Troupe

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Notes:

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# OTHER BUSINESS



- **Ham Fest: Cancelling (Larry)**
- **Planning for no ham exams next month. There were people pre-registered. 2-3 via email. Extra changes July 1 with new exams. (Allan West) . Normally fluxuates wildly. 2-15 average.**
- **Looking forward to new location of field day. Excitement is building!!**



# Introduction of Guest Speaker

## *EMERGENCY POWER*

*Earl McDow  
K4ZSW*



# **North Florida Emergency Communications Conference**

**Emergency Power**

**GARS 3/17/2020**

**Earl McDow**

**K4ZSW**

# **Emergency Power**

**Novice – 1959**

**Technician – 8/1959 – 8/1964**

**BSEE – 1968**

**Oak Ridge TN Medical Research – 1967 – 1973**

**DEC, Compaq, HP – 1973 – 2002**

**Retired – 2002**

**Technician - 9/2018**

**General/Extra - 10/2018**



# Emergency Power

I'd like to thank:

- Unknown Field Day Volunteer that rekindled my interest in Ham Radio
- GARS
- NFARC/ARES
- Gordon Gibby – KX4Z
- John Trites – KO5X
- Mike Hoskins, W0MJH - [http://www.na0tc.org/lib/exe/fetch.php?media=technical:emergency\\_power\\_for\\_ham\\_radio\\_v8.pdf](http://www.na0tc.org/lib/exe/fetch.php?media=technical:emergency_power_for_ham_radio_v8.pdf)
- Will Prowse - <https://www.youtube.com/watch?v=TJBGbufexEM>

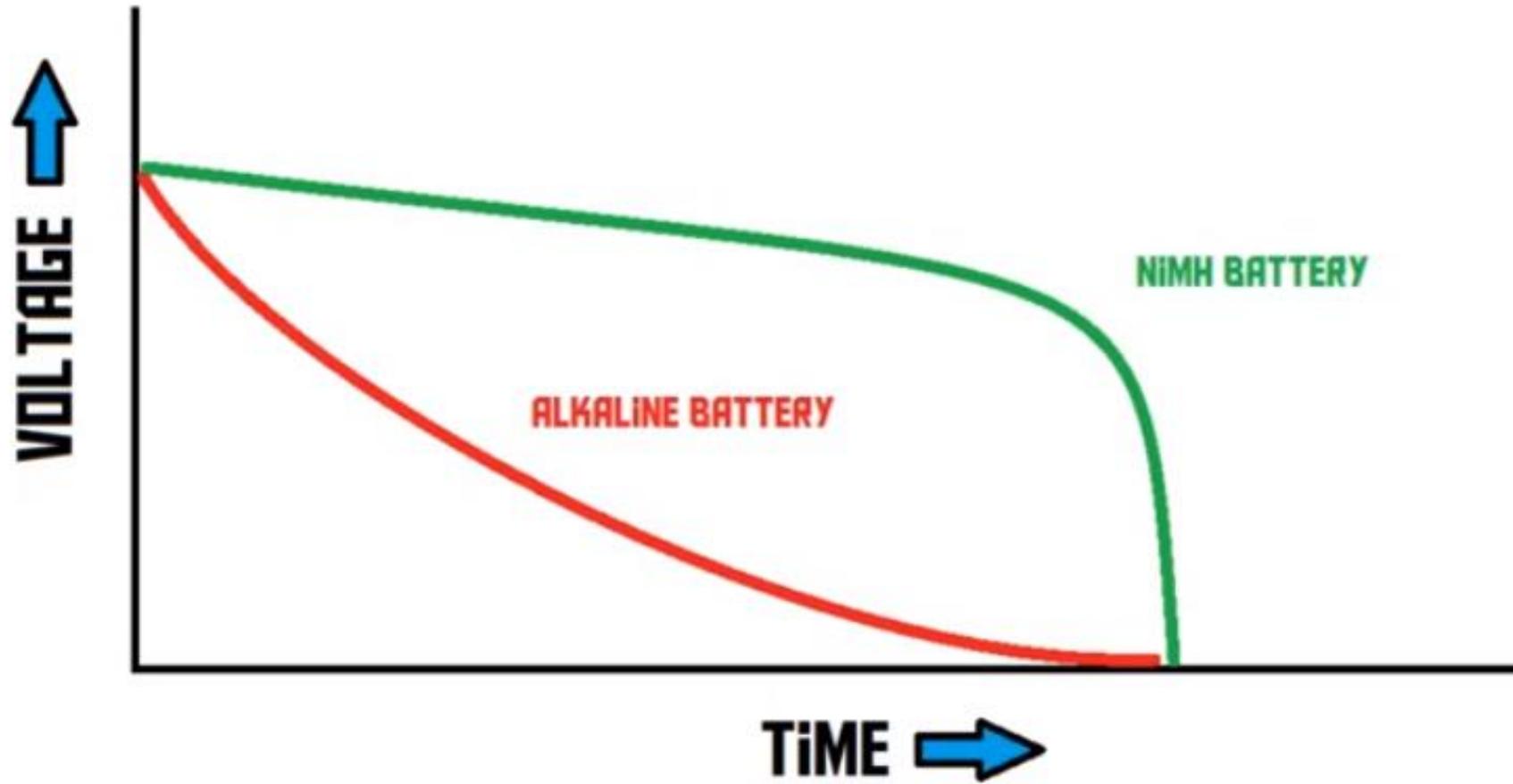
# Emergency Power - Handheld Charging Options



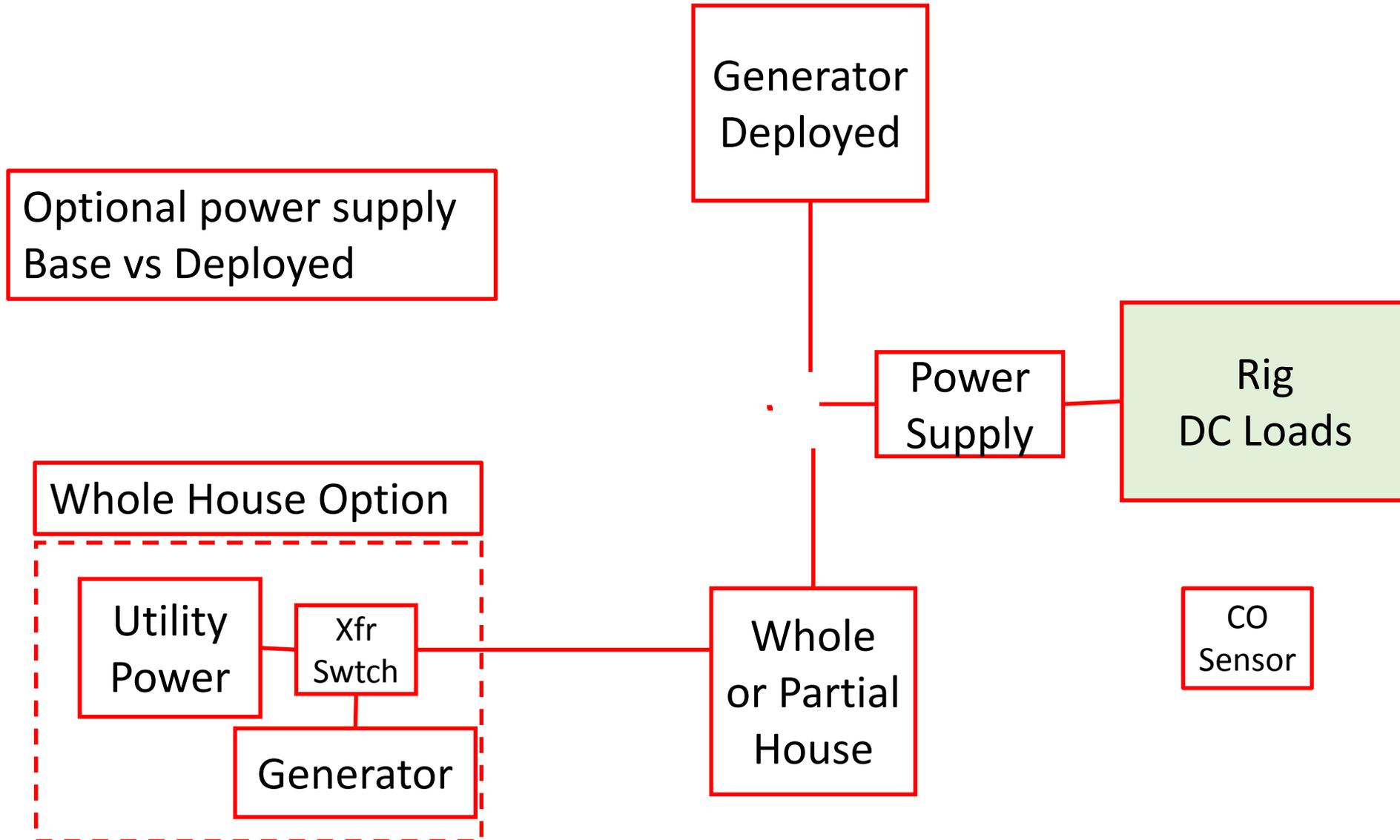
# Emergency Power – AA Battery Comparisons

AA Battery	Cost/unit	mAh	Voltage	Recharges	Brand	Charge Retention
Alkaline	\$0.80	700	1.5	None	Duracell	10 yr
Lithium	\$1.63	3000	1.5	None	Energizer	10+ yr
NiMH	\$4.17	2550	1.2	500	Eneloop Pro	85% @ 1yr
NiMH	\$2.38	2000	1.2	2100	Eneloop Std	70% @ 10 yr

# Emergency Power – AA Battery Discharge Rates



# Emergency Power – Generator Backup 120v



# Emergency Power – Fixed and Portable Generators

Whole House Surge Protection



**23KW Propane (500 gal)  
Whole House Generator**



**Transfer  
Switch**

What about RFI/Noise?



**1.8KW Portable Generator  
3 – 8 hours/1 gal**

# Emergency Power – RFI Low Pass Filter



<https://qsl.net/nf4rc/2020/LabNLunchACCommonModeChoke.pdf>

# Emergency Power – Go Box DC Ah Calculations

Usage					Deployed		
12 Volt Device	Watts	Amps	Hours	Mins	Amp Hours/Day	3 Days Operating	7 Days Operating
IC-706 Tx	240	20	1	10	23	70	163
IC-706 Rx	24	2	6		12	36	84
Misc Chargers	36	3	2		6	18	42
<b>Total Ah for IC-706MKIIG</b>					<b>41</b>	<b>124</b>	<b>289</b>
<b>Total Wh for IC-706MKIIG</b>					<b>496</b>	<b>1488</b>	<b>3472</b>

# Emergency Power – Battery Chemistry

- **Flooded Lead Acid - Wet Cell**
- **Sealed Lead Acid – Valve Regulated Lead Acid**
  - **GEL – Electrolyte in Gel form**
  - **AGM – Absorbed Glass Mat**
- **LiFePO<sub>4</sub>**

# **Emergency Power – Flooded Lead Acid**

- Top side up only**
- Require regular monthly maintenance**
- Liquid levels need to be checked monthly and topped off with distilled water**
- Lead Acid batteries release toxic hydrogen gas when charging**
- They need to be vented to the outside to prevent hydrogen gas buildup**

# **Emergency Power – Sealed Lead Acid**

- Absorbed Glass Mat & GEL Batteries**
- AGM & GEL Orientation independent**
- AGM & GEL maintenance free**
- AGM & GEL are Valve Regulated Lead Acid –  
can vent Hydrogen gas**
- Absorbed Glass Mat most popular SLA with  
90+% of market**
- AGM more expensive than FLA**

# **Emergency Power – Sealed Lead Acid**

- GEL are more expensive than AGM**
- GEL excellent at very slow deep discharge**
- GEL also last longer in hotter temperatures**
- GEL - It is critical that the correct charging parameters are used**
- AGM more resistant to vibration**
- AGM batteries can handle higher charge and discharge rates than GEL batteries**

# Emergency Power – LiFePO<sub>4</sub>

## 100 Ah AGM (Absorbed Glass Mat) vs LiFePO<sub>4</sub>

Characteristic	AGM	LiFePO <sub>4</sub>
Safety	VRLA	Safest Li Chemistry
Weight	60 lbs	27 lbs
Life Cycles(100% DOD)	300	2000 - 3000
Flat Discharge to <12V	1.5 hrs	4 hrs
Capacity usage	50% - 50Ah	85 - 90% - 90Ah
Time for Full Charge	8 hrs	2 hrs

# Emergency Power – LiFePO<sub>4</sub>

<b>100 Ah AGM (Absorbed Glass Mat) vs LiFePO<sub>4</sub></b>		
<b>Characteristic</b>	<b>AGM</b>	<b>LiFePO<sub>4</sub></b>
<b>Self Discharge (80%)</b>	<b>4 months</b>	<b>8 months</b>
<b>Initial Cost per Battery</b>	<b>LFP12100 - \$170 1 yr</b>	<b>EP12100 - \$690 10 yr EP1250 - \$450</b>
<b>Cost for 100 Ah (2xAGM - 1xLiFePO<sub>4</sub>)</b>	<b>\$340</b>	<b>100Ah - \$690    50Ah - \$450</b>
<b>10 Yr Cost of Ownership</b>	<b>3 x \$340 = \$1020</b>	<b>100Ah - \$690    50Ah - \$450</b>

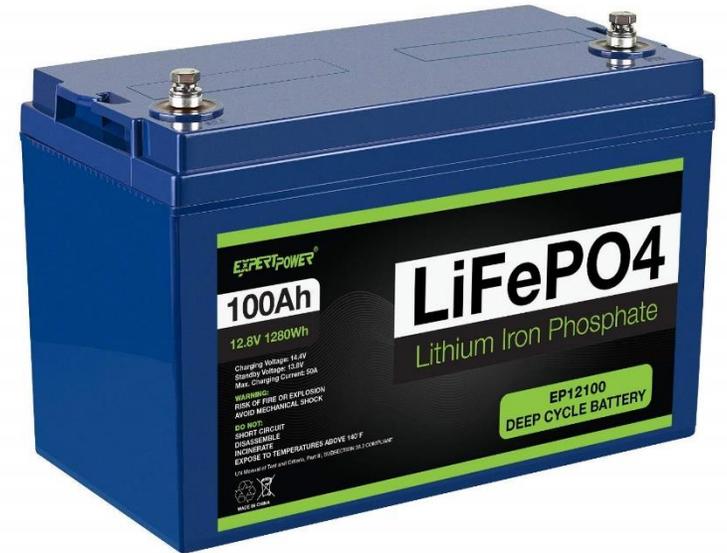
# Emergency Power – Main Batteries



**Deep Discharge Marine  
Flooded 105 Ah Lead Acid  
\$120**

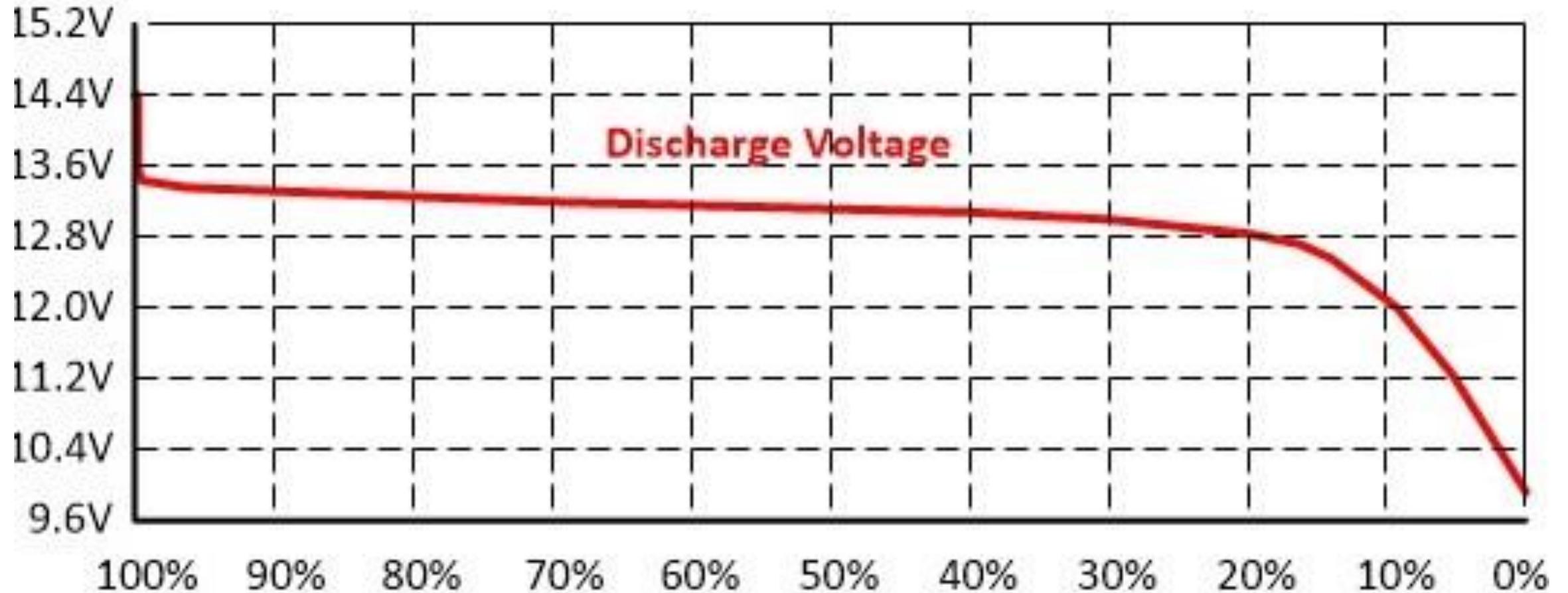


**Deep Discharge GEL  
100 Ah \$200**

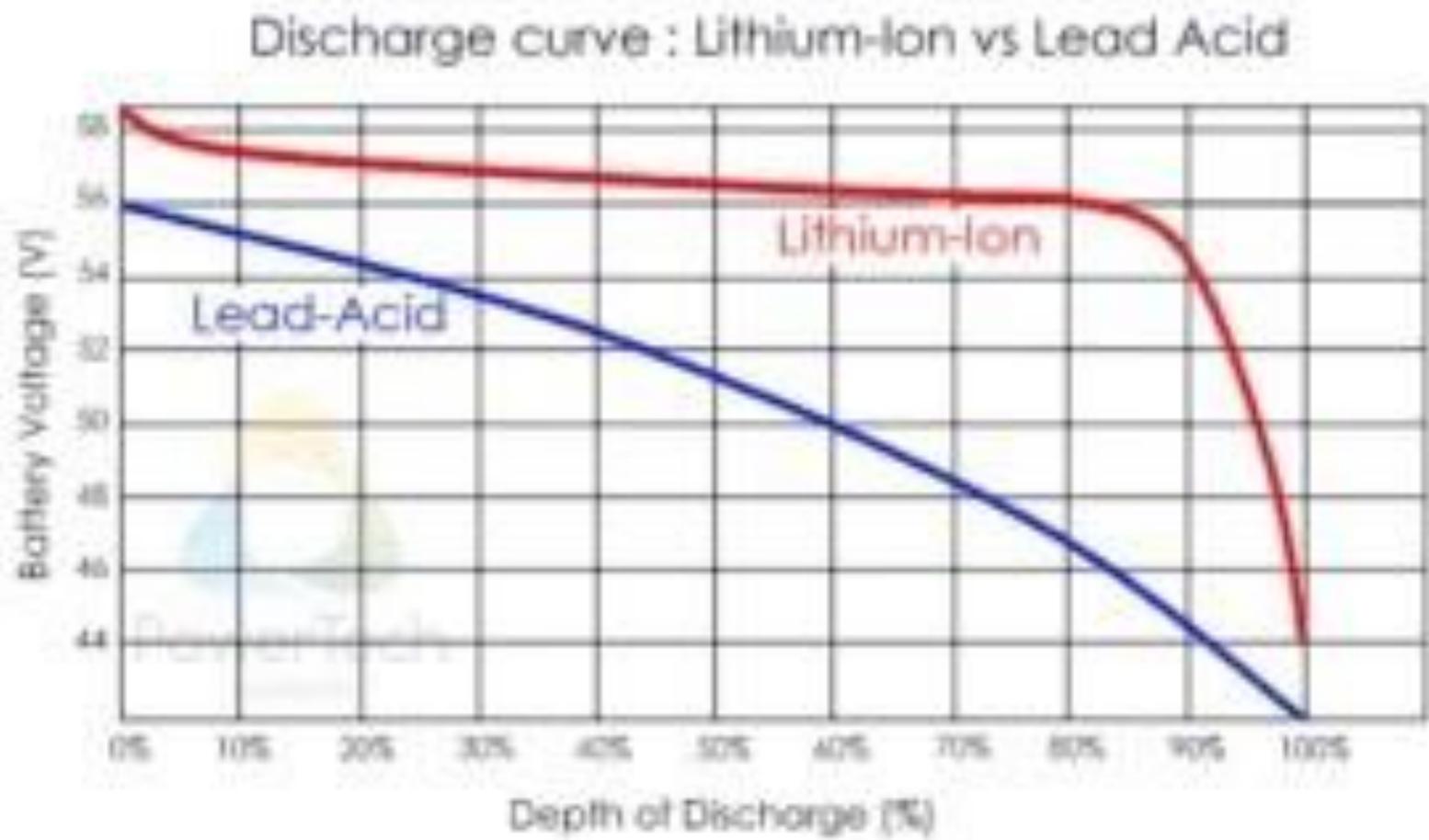


**Deep Discharge LiFePO<sub>4</sub>  
100 Ah \$790**

# Emergency Power – LiFePO<sub>4</sub> Discharge Curve



# Emergency Power – $\text{LiFePO}_4$ vs Lead Acid Discharge Curve



# Emergency Power – Solar Backup

Battery Calculation		Ah	Wh	Comments
IC-706MKIIG GO Box		41	492	Calculate Load in Wh
2 Days Autonomy		82	984	Allow 2 cloudy days
Battery LiFePO4 (100%)		1x100Ah	1x1200 Wh	
Battery Lead Acid (50%)		2x50Ah	2x600 Wh	
Battery Size			1200 Wh	Size Battery in Wh
Solar Panel Sizing		Amps	Watts	Comments
Solar Panel (5 day Index)		16	240	Battery Wh/Index of 5
Round up for safety		25	250	Round up
MPPT Solar Controller (Amps)			21 amps	Panel Watts/12 Volts

# Emergency Power – Batteries

Battery Chemistry	Usable 100 Ah Cost	Cycles	Life (Yrs)	100Ah Cost	#	COO-10
Flooded Lead Acid	2 X \$100 - \$150	300	2 to 3	\$250	10	\$2,500
AGM ( Absorbent Glass Mat)	2 x \$170	500	4 to 7	\$340	6	\$2,040
GEL	2 x \$200	1000	2 to 5	\$400	3	\$1,200
LiFePO <sub>4</sub>	\$500 - \$950	3000	5 to 10	\$950	1	\$950

# Emergency Power – Charge Controllers

- **PWM – Pulse Width Modulation**
  - **Less Expensive**
  - **Pulses generate RFI**
  - **Inefficient operation**
- **MPPT - Maximum Power Point Tracking**
  - **Input Power equals Output Power**
  - **Support higher voltage panels efficiently**
  - **Less RFI**

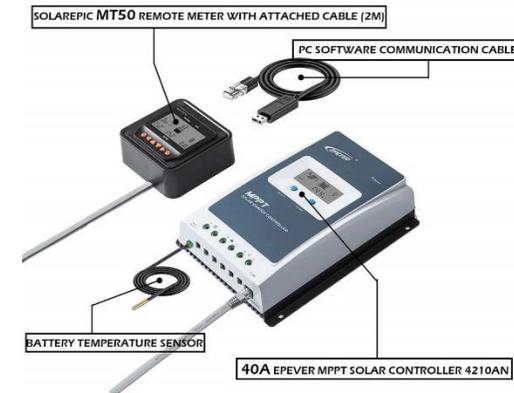
# Emergency Power – Solar Charge Controllers



Li-ion, LiFePO<sub>4</sub>, LTO, Gel, AGM, Flooded, and Calcium PWM 20A \$50



LiFePO<sub>4</sub> & Li(NiCoMn)O<sub>2</sub> MPPT 10A \$50



LiFePO<sub>4</sub> & Li(NiCoMn)O<sub>2</sub> MPPT 40A \$150

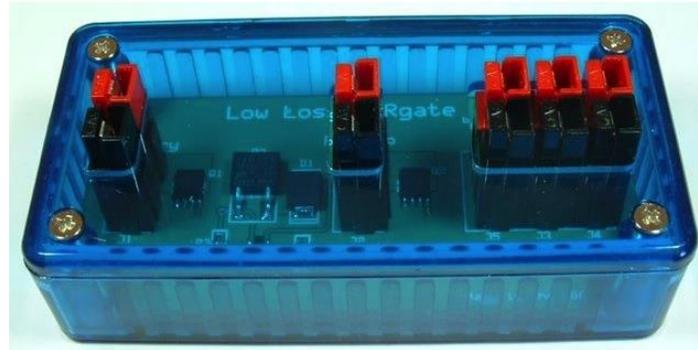
# Emergency Power – Transfer Switches

- **Ham Source EZGate**
  - **Switch**
  - **SLA Charger**
- **Low Loss PWRGate by KI0BK**
  - **Switch**
  - **SLA Charger**
- **Western Mountain Epic PWRGate**
  - **Switch**
  - **Supports Solar Panels with MPPT Controller**
  - **Multiple Chemistry Charger**

# Emergency Power – PWRGate Transfer Switch



**Epic PWRgate \$190**  
**Multiple Charge**  
**Options**  
**Solar Panel Connection**  
**40A MPPT Controller**



**Low Loss PWRgate by KI0BK \$70**  
**SLA Charger**



**Ham Source EZGate \$75**  
**SLA Charger**

# Emergency Power – Solar Panels

- **Monocrystalline solar panels**                      **12.5% - 20%**
- **Polycrystalline solar panels**                      **11% - 18%**
- **Thin-film (amorphous) solar panels**    **5% - 9%**
  - **Thin-film has lower losses & performs better in:**
    - **Hot climates and higher temperatures (FL)**
    - **Low irradiation conditions, i.e. early in the morning, at sunset and in cloudy weather**
    - **Partial shading conditions**
  - **Low cost, low weight and high durability are ideal for emergency deployment.**

# Emergency Power – Solar Panels



**eBay Thin Film 158W \$158**



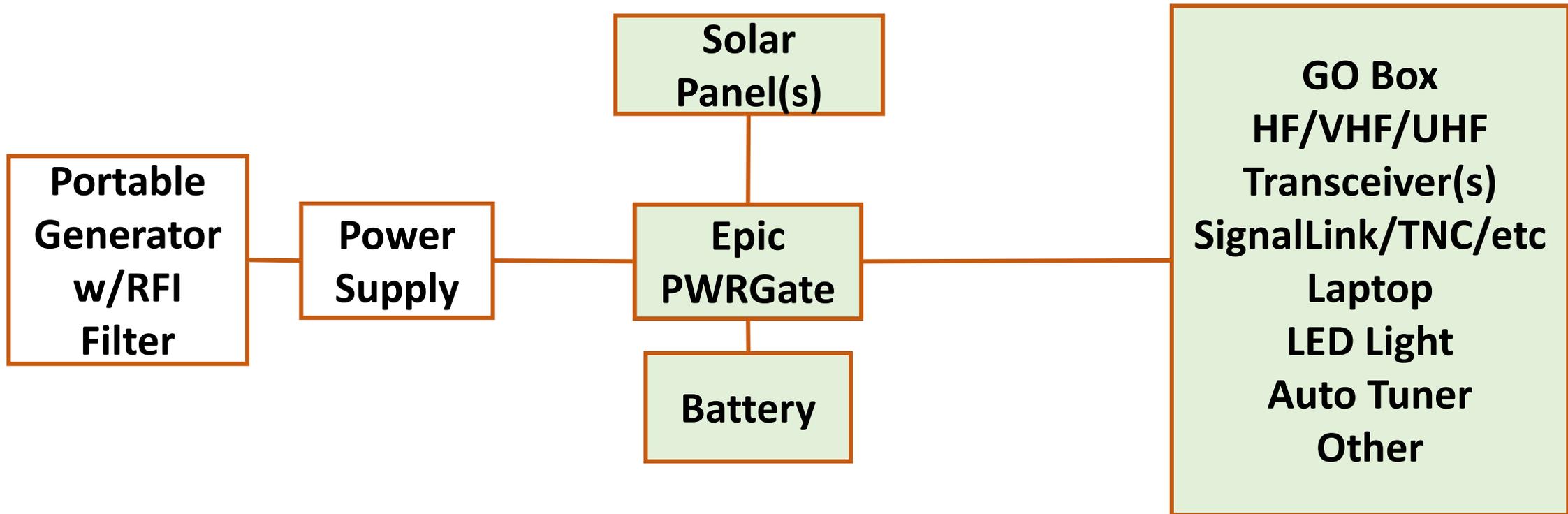
**60W \$160**

**Order for install/uninstall solar panel to the battery system via charge controller:**

- 1. Battery**
- 2. Panel**
- 3. Load**

- 1. Load**
- 2. Panel**
- 3. Battery**

# Emergency Power – Deployed AC and/or DC



DC Model with Battery/Solar/Generator Backup

# Emergency Power – Laptop Charging

12V

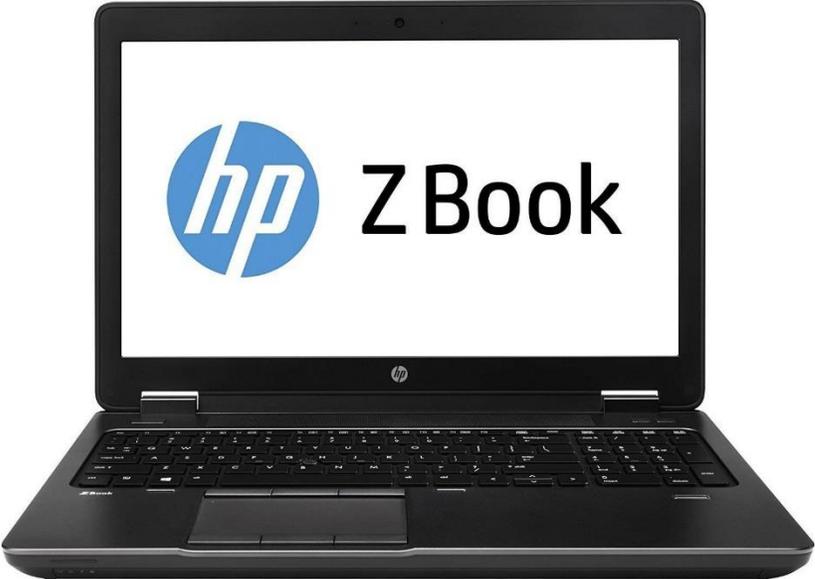


19.5V @7.7A

12V

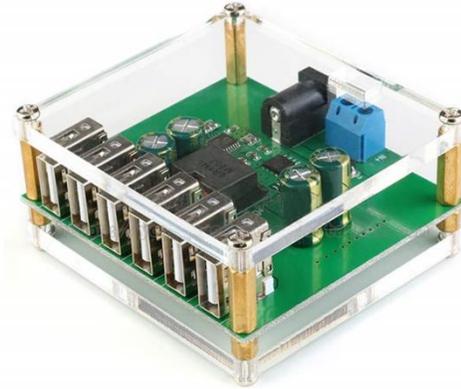


19.5V @7.7A



# Emergency Power – USB Devices

- **Raspberry Pi**
- **Phone Chargers**
- **Other**



# **Emergency Power – Conclusion**

## **Be Prepared**

- Keep battery(s) charged**
- Keep Extra non-rechargeable batteries**
- Keep computers updated and charged**
- Test Generators un-Loaded and Loaded**
- Test Go Box and all supporting equipment**
- Keep equipment organized with check list and readily available**

# Emergency Power – Handy URLs

- **Solar Electricity 101 -**  
<https://www.youtube.com/watch?v=cX4s-bxn4fs>
- **How to Size your Solar Power System –**  
<https://www.youtube.com/watch?v=TJBGbufexEM>
- **Complete LiFePO4 Solar Battery System Design -**  
[https://www.youtube.com/watch?v= PgthByAYz4](https://www.youtube.com/watch?v=PgthByAYz4)
- **Emergency Lighting**  
<https://www.youtube.com/watch?v=ZNa-JHPnpgM>



# COVID - 18 Update: Jeff Capehart

# Motion to Adjourn

-ending notes: need presenters  
call John Troupe

