

Radio & Satellite Comms Conns:

- Mis aimed antennas
- Adjacent satellites with overlapping frequencies can disrupt communication
- Satellite equipment failure
- Band with limitations of signal



Radio & Satellite Comms Cons:

- Severe weather can interfere: rain and snowstorms can reflect radio signals.
- Space weather {solar flares, geomagnetic storms, sun radiation during solar eclipses} can affect satellite transmission.



What do you use to communicate?

Results:

- Coordinates can be sent to base and receiving pagers.
- Faster timeline for rescue and triage.
- Encourages survivors & rescuers to stay at current location.
- Equipment is reusable.
- Accessible & easy to use.



"Their overly detailed and static nature can discourage responders from referencing them in time-sensitive situations, where concise and actionable information is crucial [79]. Additionally, the absence of standardised digital formats or integration into interactive platforms diminishes their utility, leaving them outdated and difficult to adapt to evolving disaster contexts [80]."

Coordinate Reach

- Therefore, it would be possible to change the thermal threshold to trigger specific coordinates when flare is fired.



Thermo GPS Flares

Shelby Shepherd Paediatric Emergency & Trauma RN, BSN



Expiration Date...

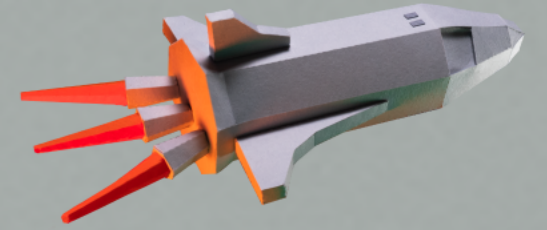


- 40% of marine flares are expired prior to use

- Average shelf life is 3-4 years, damp conditions can expedite expiration



Prototype A:



Thermal Protectant Band:

- 1,600-2000 C flare fires off
- Ceramic material and Tungsten refractory metal can withstand heat



Logistics:

- **Thermo GPS has automatic pressure release when flare is triggered to eject off thermal protectant band.**
- **Band around flare is designed to absorb heat from flare when fired.**
- **Thermo GPS is reusable!**



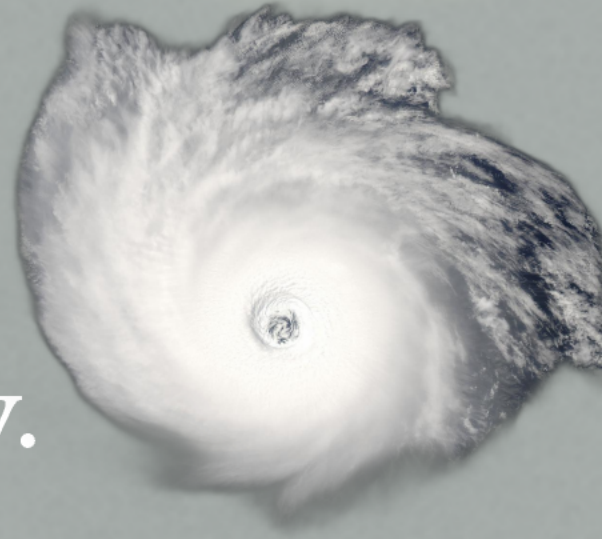
Bringing The Flare To Life:

- Thermo GPS flares on board an aero medical unit can be used to signal in distress when:
- an aircraft fails
- if more aid is needed in a catastrophe setting
- natural disasters
- comms malfunctions



Geofences:

- Geofences can notify if a locator device leaves a specific boundary.
- Boundaries that are deemed unsafe due to extreme weather conditions etc., the GPS will fire off a warning coordinate to the receiving base.





Coordinate Reach

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bystatemap.com

**What do you use to
communicate?**

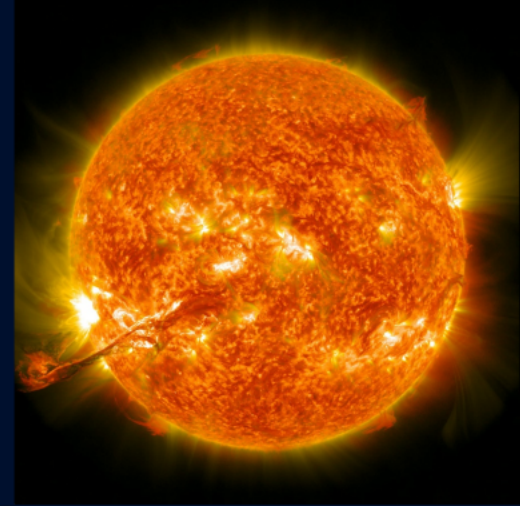
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Existing Evidence Part One:

- Unicef is using cold chain monitoring to transport vaccines at regulated temperatures to remote areas.
- First step in monitoring variant temperatures in the field.

3. [UNCIEE. \(n.d.\). Vaccine carriers | Unicef Supply Division. UNICEF Health Technologies: What is A Cold Chain?: Vaccine Carriers. https://www.unicef.org/supply/vaccine-carriers](https://www.unicef.org/supply/vaccine-carriers)



Existing Evidence Part Two:

- SeeWorld, global dynamic location service company has GPS thermo monitoring in use in cold chain vehicle efficiency.
- This is for transportation of cold storage products.
- GPS implementation in monitoring temp is already in motion.

Civilian Use:

- National Parks, Outposts, Remote Ranches, Boating & Sailing



Results:

- Coordinates can be sent to base and receiving pagers.
- Faster timeline for rescue and triage.
- Encourages survivors & rescuers to stay at current location.
- Equipment is reusable.
- Accessible & easy to use.



When In Doubt, Flare It Out.



References:

1. Schauer, K. (2020, October 6). Space communications: 7 things you need to know. NASA. <https://www.nasa.gov/missions/tech-demonstration/space-communications-7-things-you-need-to-know/>

2. Abbas, R., & Miller, T. (2025). Exploring Communication Inefficiencies In Disaster Response: Perspectives of Emergency Managers and Health Professionals. *International Journal of Disaster Risk Reduction*, 120(1). <https://doi.org/https://doi.org/10.1016/j.ijdrr.2025.105393>.

3. UNICEF. (n.d.). Vaccine carriers | Unicef Supply Division. UNICEF Health Technologies: What is A Cold Chain?: Vaccine Carriers. <https://www.unicef.org/supply/vaccine-carriers>

4. Cognizant. (n.d.). Cold Chain Monitoring. www.cognizant.com. <https://www.cognizant.com/us/en/glossary/cold-chain-monitoring>

5. One-stop GPS tracking solution for fleet: SEEWORLD®. SEEWORLD. (2025, June 26). <https://www.seeworldgps.com/>

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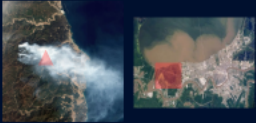
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- Severe weather can interfere: rain and snowstorms can reflect radio signals.
- Space weather (solar flares, geomagnetic storms, sun radiation during solar eclipses) can affect satellite transmission.

What do you use to communicate?

Civilian Use:

- National Parks, Outposts, Remote Ranges, Boating & Sailing



"Their overly detailed and static nature can discourage responders from referencing them in time-sensitive situations, where concise and actionable information is crucial [7]. Additionally, the absence of redundancy in digital formats or integration into infrastructure platforms diminishes their utility, leaving them isolated and difficult to adapt to emergency disaster contexts [10]."

Results:

- Coordinates can be sent to base and receiving pages.
- Enter timeline for rescue and triage.
- Encourages survivors & rescuers to stay at current location.
- Equipment is reusable.
- Accessible & easy to use.



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QUESTIONS?

References:

1. Schmitt, K. (2020, October 03). Space communication: 7 things you need to know. NASA. <https://www.nasa.gov/mission/earth-demonstration/space-communications-7-things-you-need-to-know/>
2. Abbas, R., & Miller, T. (2025). Exploring Communication Inefficiencies in Disaster Response: Characteristics of Emergency Managers and Health Professionals. *International Journal of Disaster Risk Reduction*, 12(2/3). <https://doi.org/10.1016/j.ijdrr.2025.102393>.
3. UNICEF. (n.d.). Vaccine Carriers | Unicef Supply Division, UNICEF Health Technology. <https://www.unicef.org/supply/vaccine-carriers>
4. Logisland, Inc. Cold Chain Monitoring. www.logisland.com/ask/on-temperature-chain-monitoring
5. One-stop GPS tracking solution for fleet: SEEWORLD. SEEWORLD. (2025, June 26). <https://www.seeworldgps.com/>



Coordinate Reach

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Existing Evidence Part Two:

- SeeWorld, global dynamic location service company has GPS thermo monitoring in use in cold chain vehicle efficiency.
- This is for transportation of cold storage products.
- GPS implementation in monitoring temp is already in motion.

Existing Evidence Part One:

Used in using cold chain monitoring to transport vaccines at regulated temperatures to remote areas.

First step is monitoring ambient temperatures in the field.



Geofences:

Geofences can notify if a locator device leaves a specific boundary.

Boundaries that are deemed unsafe due to extreme weather conditions etc., the GPS will fire off a warning coordinate to the receiving base.



Thermal Protectant Band:

- 1600-2000 C flare fires off
- Ceramic material and Tungsten refractory metal can withstand heat



Logistics:

- Thermo GPS has automatic pressure release when flare is triggered to eject off thermal protectant band.
- Band around flare is designed to absorb heat from flare when fired.
- Thermo GPS is reusable!

Logistics Part Two:

- Thermal geotag attached to the flare will automatically issue a coordinate to the closest base.
- Certain GPS locators also have geofences that notify if a locator device leaves a specific boundary.

Bringing The Flare To Life:

- Thermo GPS flares on board an aero medical unit can be used to signal in distress when:
 - an aircraft fails
 - if more aid is needed in a catastrophe setting
- natural disasters
- comms malfunctions



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Prototype A:



Expiration Date...

Average shelf life is 3-4 years, being conditions can expedite expiration

40% of marine flares are expired prior to use

