Rural Training Center – Thailand (RTC-TH)

FOCUS

Community-based Environmental Education for the Self-sufficiency and Sustainability of Small Rural Family Farms

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Grassroots Emergency Communications Operations

Non-Radio Ground-to-Air Signals

#3 Basic LZ / DZ Support

Rural Training Center-Thailand Emergency Communications

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This is an RTC-TH EmComm GECO presentation

GECO stands for Grassroots Emergency Communications Operations. It is an all volunteer people-to-people effort to provide information about emergency communications to those living in remote rural areas. In most cases the lessons can be self-taught or adapted to elementary school students. The idea is to use GECO to also help improve rural education.

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The Non-Radio GTA Signals Series

A three part series about non-radio ground-to-air signals for emergency communications.

These methods can be used to communicate with aircraft when no GTA radio is available or when radio equipment fails.

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www.neighborhoodlink.com/rtc-th_Tech/pages

Learn more about the RTC-TH in Note#1 after this presentation.

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Educational Note

This presentation is formatted for individual study or viewing on a single computer screen by a few people.

If showing this presentation to a larger group, a narrator must be available to read some of the slides with text which may not be legible to the majority of the audience.

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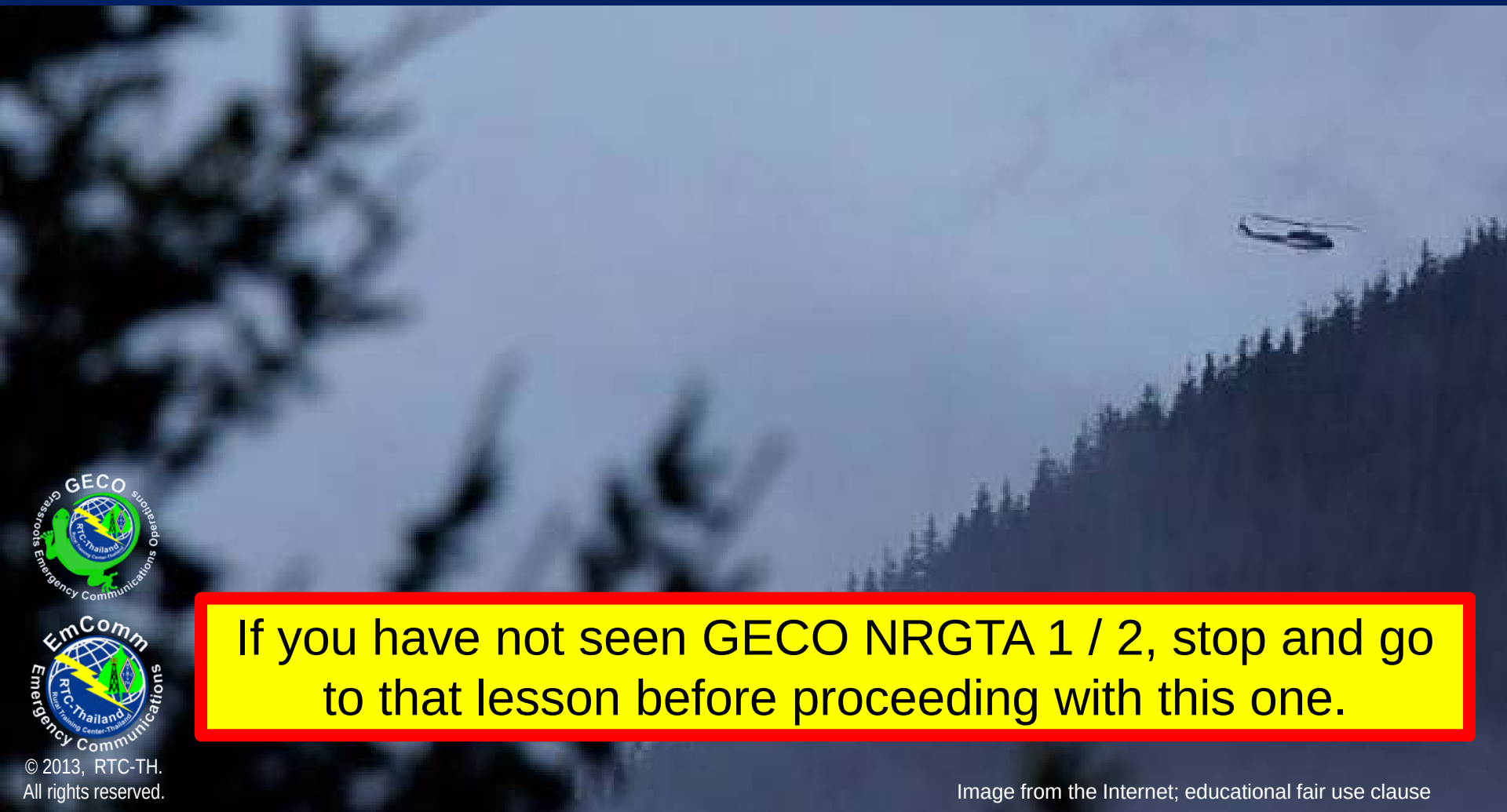
Disasters and Helicopters

The first lesson in this series taught you how to attract an aircraft.



If you have not seen GECO NRGTA 1 / 2, stop and go to that lesson before proceeding with this one.

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About This Lesson

This lesson describes the basic non-radio GTA signals needed for minimal support of a village LZ / DZ.

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- Provide a long range homing signal
- Provide LZ / DZ wind direction / speed.
- Set needed GTA signal panels
- Provide minimal gesture signals as needed.

The pilot in command has final say about using any LZ

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Assumptions

- You have already studied the 2 previous lessons in this series: GECO NRGTA 1 & 2.
- You have already scouted out a safe area for a landing zone or drop zone near your village.
- When disaster strikes, helicopters may be the first outside help to arrive.
- You do not have radio contact with the aircrew. (Most aircraft are unable to receive ham radio frequencies.)
- Night flight operations are unlikely in remote areas (especially mountainous regions). This lesson does not cover night ops.

If these don't apply to you, this lesson may not be very useful.

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Assumptions

- EmComm involves both radio and non-radio methods.
- Effective EmComm uses an appropriate method suited to the circumstances.
- EmComm teams should be ready to use non-radio GTA signals if / when radio equipment fails or malfunctions.
- These signals must be robust and simple to be useful in an austere disaster setting.

If these don't apply to you, this lesson may not be very useful.

See Note #2 Other assumptions after the end of this presentation.

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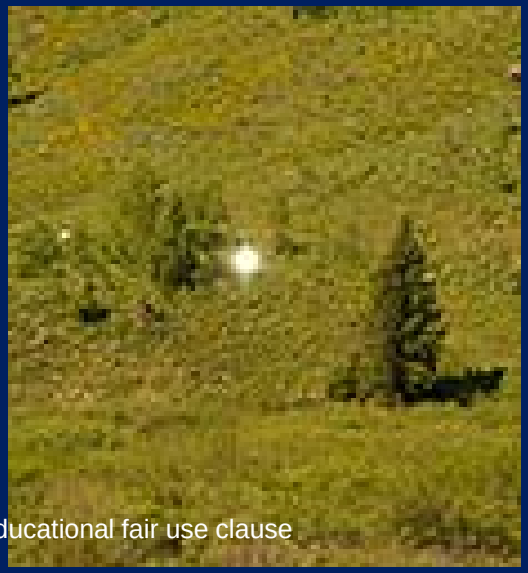
Provide a Long Range Homing Signal

The strategy is to:

- listen for approaching aircraft;
- start the smoke signal fire;
- start sending mirror flashes.



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The idea is to help the aircrew spot you as far out as possible.

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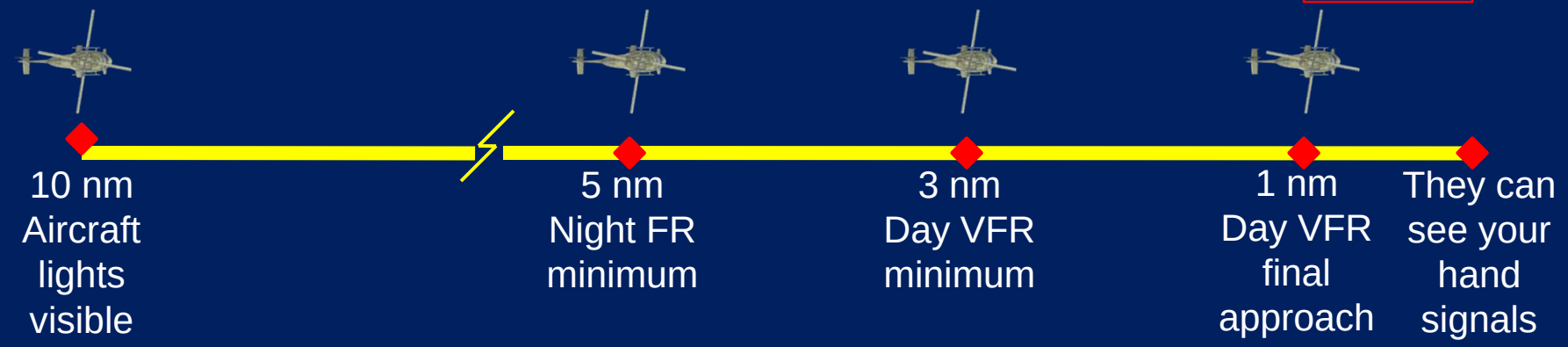
Suggested Village Range Marks

Long range approach signaling	Approach signaling	
Smoke signals / mirror flashes	Mirror flashes	Stop Mirror flashes



These distances should be on a map as a part of your village emergency plan.

FFI: Learn how to use the Geographic Systems Model to make an emergency plan.

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Helicopter image from the Internet; educational fair use clause

Advisory Note

At 1 nm out from the LZ / DZ, assume the aircraft is on a “final approach”.
The pilot should have visually confirmed the LZ / DZ.

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Stop using mirror flashes.
Be careful not to blind the pilot.

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Suggested Additional Equipment

You may find the following helpful.

Binoculars

To help spot aircraft

Whistle

Megaphone

To alert GTA signals team of approaching aircraft

See Note #2 for how to make a low cost megaphone.

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Prepare the LZ / DZ Identication

Confirm and clear the LZ / DZ markings as specified in the village emergency plan.

The pilot in command has final say about using any LZ

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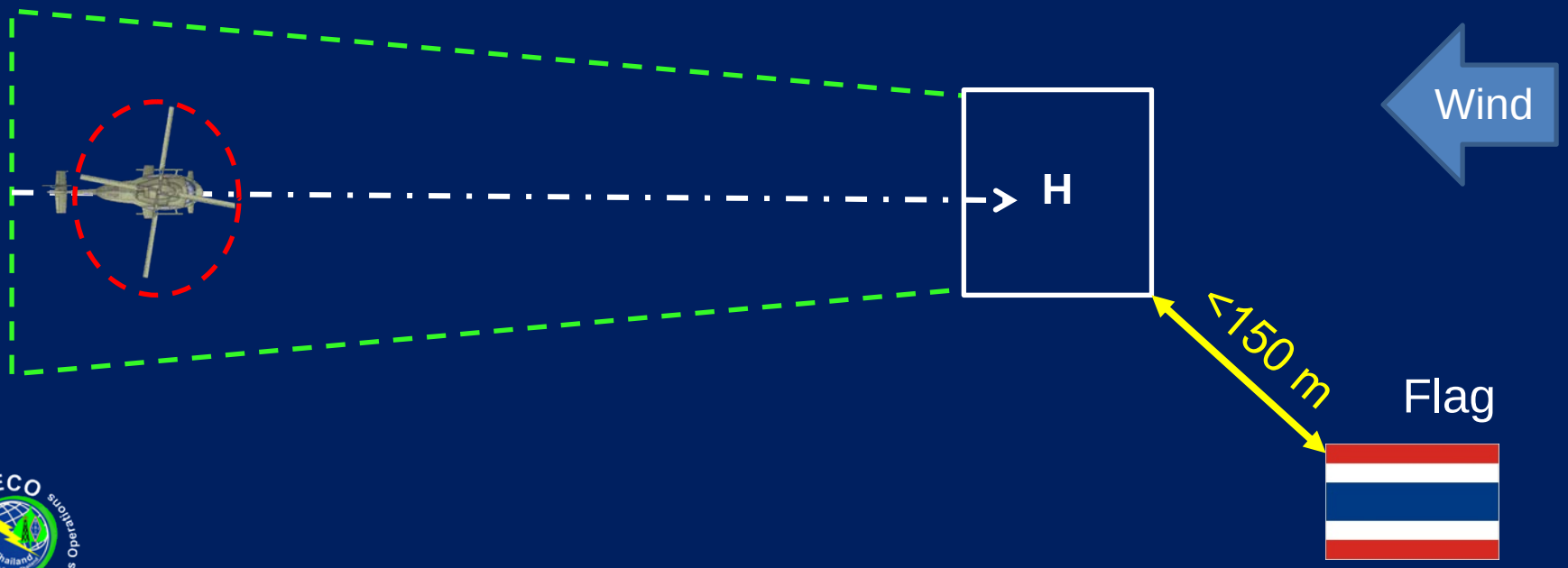
Prepare the LZ / DZ Identication

Set LZ / DZ wind direction / speed indicator according to the village emergency plan



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Monitor LZ / DZ Wind Speed

Use the RTC-TH MEWS Beaufort Wind Chart

Watch the LZ / DZ flag and use the diagrams on the chart to estimate the wind speed.

Know the wind speeds that affect helicopter operations. Then you can better anticipate flight operations at the LZ / DZ.

See Note #3 to get a free copy of the RTC-TH MEWS Beaufort Wind Chart

Beaufort Wind Table for Land Effects

MEWS weather observers should set up a flag near their operating position. Use the Description and flag references to estimate the wind speed. Report the range of wind speeds from the chart rather than a specific number.

Description	Flag	WMO term	Mph	Km/ hr	Knots	Force	Psu lbs/sq ft (Kg/sq m)
			Report wind speed in knots to flight crews				
Calm; smoke rises vertically	---	Calm	<1.0	<1.5	<0.9	0	0.006266 (0.003059)
Smoke indicates wind; flag hangs limp, wind vanes do not move		Light Air	1-3	1.5-6	1-3	1	0.02924 (.01428)
Wind felt on face, leaves rustle, flag stirs, wind vanes move		Light breeze	4-7	6-12	4-6	2	0.142 (0.6934)
		5 Knots maximum tailwind for helicopter take-off					
Leaves and twigs in constant motion; flag occasionally extends		Gentle Breeze	8-12	12-20	7-10	3	0.3759 (1.835)
		10 Knots ideal for helicopter flight operations					
Dust and paper fly; small branches move; Flag flaps		Mild Breeze	13-18	21-29	11-16	4	0.8145 (3.977)
small leafy trees begin to sway; white crested wavelets appear on lakes/ponds; Flag ripples		Fresh Breeze	19-24	30-39	17-21	5	1.504 (7.342)
		20 Knots maximum gusts for helicopter flight operations					
Large branches move; wires whistle; umbrellas hard to use; Flag snaps		Strong Breeze	25-31	40-50	22-27	6	2.485 (12.13)
Whole trees sway; hard to walk; Flag extended		Near Gale	32-38	51-61	28-33	7	3.822 (18.66)
Twigs and small branches broken; cars veer on roads; Flag tatters		Gale	39-46	62-74	34-40	8	5.597 (27.33)
Slight structural damage occurs (roof shingles blow off)		Strong Gale	47-54	75-87	41-47	9	7.769 (37.93)
		45 Knots maximum winds for helicopter flight operations					
Trees broken or uprooted, considerable damage to buildings		Storm	55-63	88-101	48-55	10	10.53 (51.39)
Wide spread damage caused	---	Violent Storm	64-72	102-114	56-63	11	13.78 (67.3)
	---	Hurricane	>73	>115	>63	12	>13.78 (>67.3)

Disclaimer: Use of the pressure data to calculate tower/antenna wind loads is at your own risk. The RTC-TH and HSØZHM assume no liability for the use of this data. Pressure values are the upper limits for a wind category.

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Monitor LZ / DZ Wind Speed

Helicopter flight operations may be limited when

- Tail winds exceed 5 knots = *No Take-off*
- Winds gust at 20 knots or more = *No flights*.
- Winds are 45 knots or more; *No flights*.

Beaufort Wind Table for Land Effects

MEWS weather observers should set up a flag near their operating position. Use the Description and flag references to estimate the wind speed. Report the range of wind speeds from the chart rather than a specific number.

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Wind felt on face, leaves rustle, flag stirs, wind vanes move		Light breeze	4-7	6-12	4-6	2	0.142 (0.6934)
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	---	Hurricane	>73	>115	>63	12	>13.78 (>67.3)

Disclaimer: Use of the pressure data to calculate tower/antenna wind loads is at your own risk. The RTC-TH and HSØZHM assume no liability for the use of this data. Pressure values are the upper limits for a wind category.

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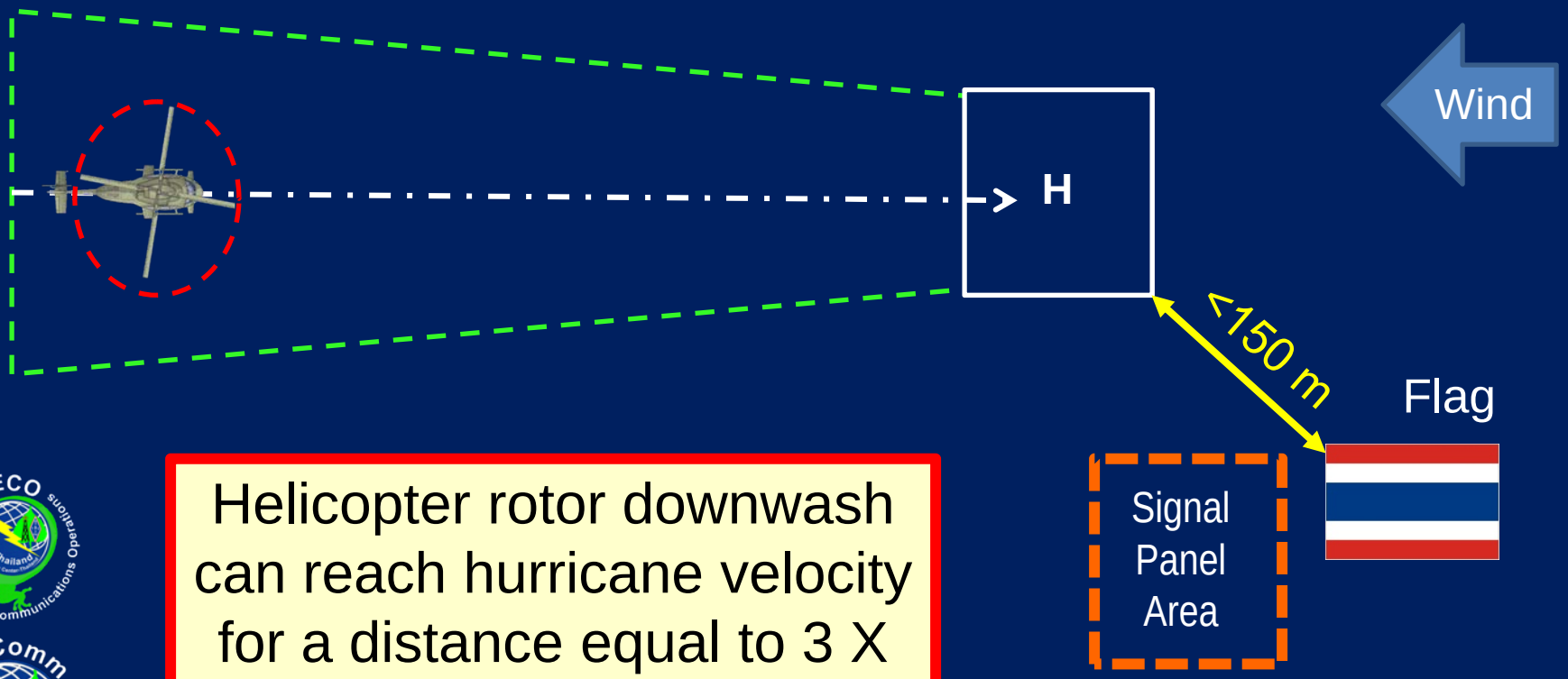
Set Needed GTA Signal Panels

Ideally the GTA signal panels are set in a clear area ~ 100 m away from the LZ / DZ.



Helicopter rotor downwash can reach hurricane velocity for a distance equal to 3 X the rotor diameter.

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Set Needed GTA Signal Panels

Make sure all GTA signal equipment is ready.
Coordinate signal panels / messages with village leaders.

ITU Survivor Ground-to-Air Signal Panels			
Need doctor / serious injuries		Yes	
Need medical supplies		No	
Need food / water		Don't Understand	
Going in this direction		Each panel is 1 m wide x 6 meters long. A minimum of 4 panels are needed for a set.	

For more details on GTA signal panels, see presentation #2 in this series.

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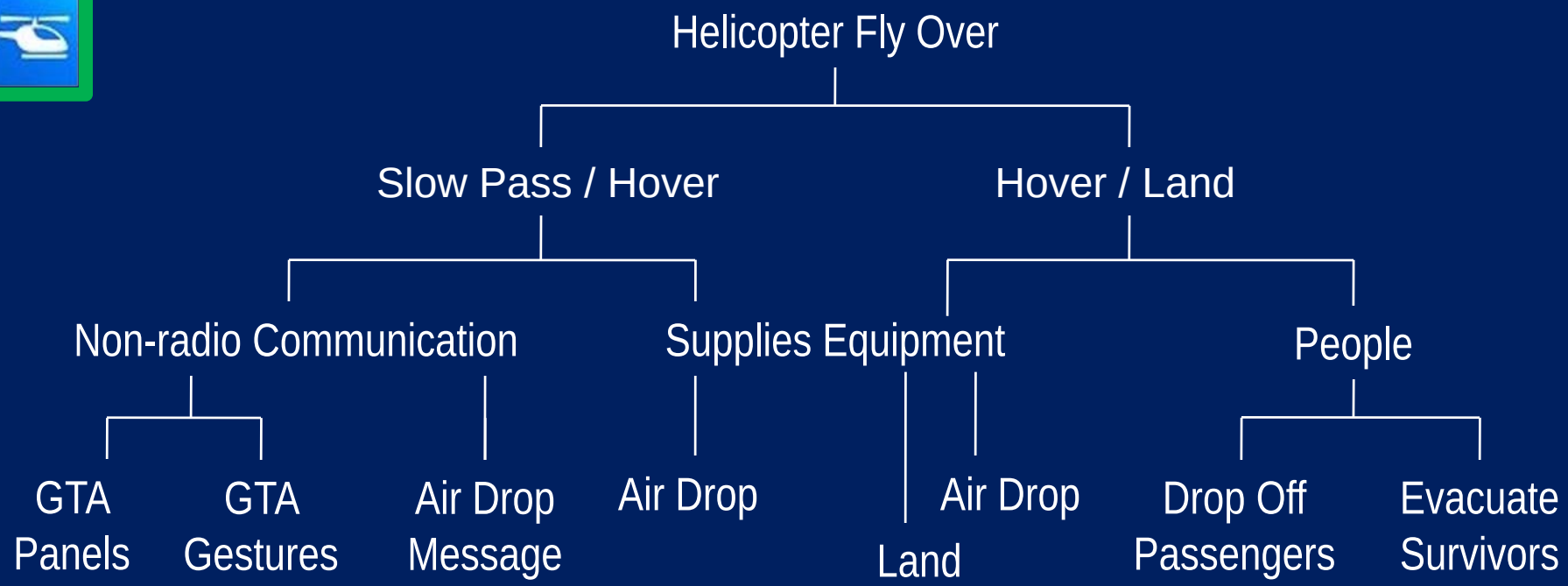
Upon Helicopter Arrival



With no direct aircrew radio contact, ground teams must know / anticipate possible helicopter actions. Air dropped messages may be possible.

The pilot in command has final say about using any LZ

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Upon Helicopter Arrival

Even with detailed village information, most pilots will make one or more inspection passes around the LZ / DZ.

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The pilot in command has final say about using any LZ

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Be Careful When Waving to Helicopters

Teach everyone ***not*** to wave with 2 arms over their head when they see helicopters approaching

This is the signal UNSAFE ;DO NOT LAND. They may turn around and leave you.

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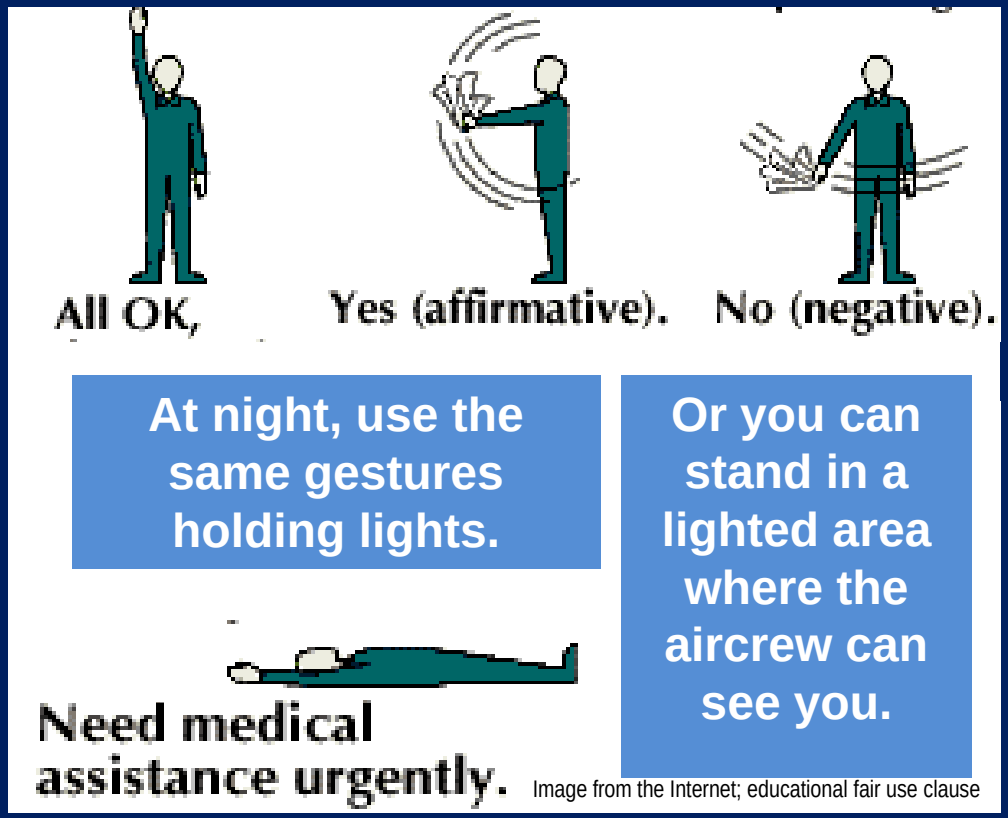
Body Gestures at the LZ / DZ

Body gestures are a faster signaling method than using signal panels.

Communication is very limited. It may be best to use a combination of gestures and signal panels.



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The pilot in command has final say about using any LZ

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Possible Aircraft Responses to GTA Signals

During daylight, helicopters may be low enough for aircrews to gesture to you or drop a message.

These are ("unofficial") common familiar hand signals that may be used.

Watch the aircrew for signals; the pilot is busy flying.

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Possible Aircraft Responses to GTA Signals

Fixed wing aircraft can also drop messages.

An air dropped message has a colored streamer for higher visibility.

Depending on the message, it may be possible to respond by GTA signal panels or body gestures.

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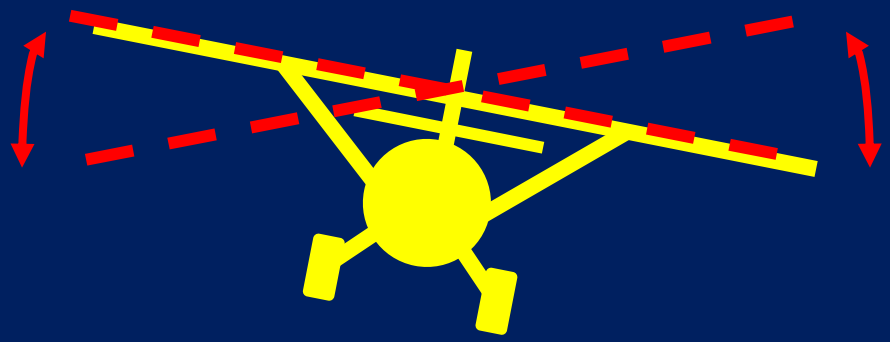
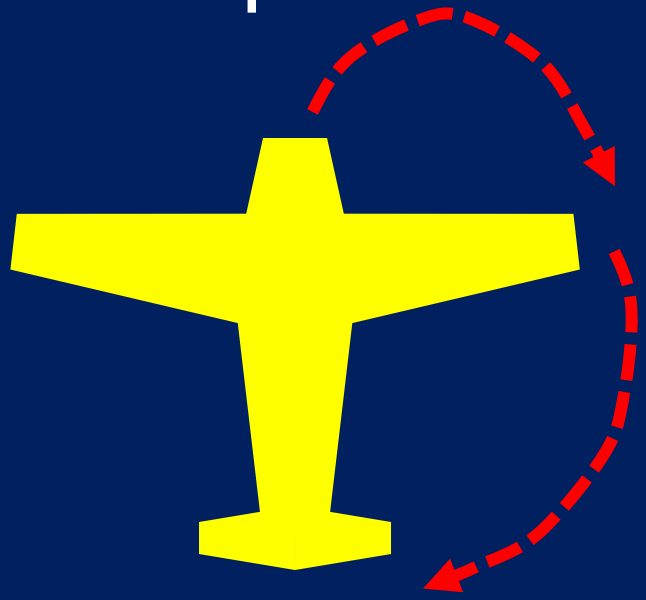
Fixed Wing Aircraft Responses to GTA Signals

If fixed wing aircraft see your GTA signals, these are some standard responses.





Signal Received; Understood

Pilot rocks wings up and down.

Signal Received; Not Understood

Pilot plane in a full circle to the right

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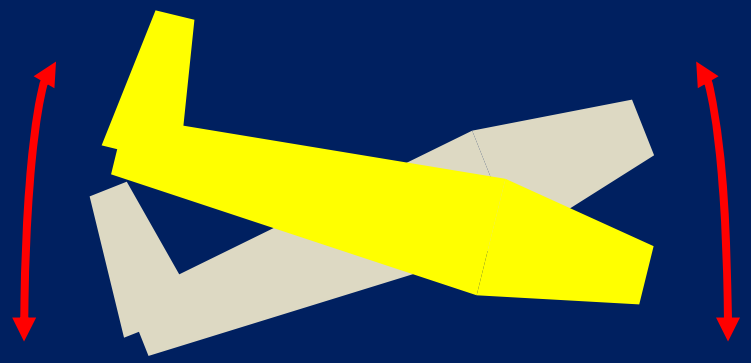
Fixed Wing Aircraft Responses to GTA Signals

If fixed wing aircraft see your GTA signals, these are some standard responses.



Yes

Pilot dips plane up and down.

No

Pilot skids plane left and right

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Village Landing vs. Drop Zone

Factor	Landing Zone	Drop Zone
Size (min)	34 m X 34 m (larger is better)	
Slope (max)	7°	Variable; can be more than 7°
Vertical Obstructions	None	No wires; 0.3 m or less in LZ
Landing Spot	Flat, clear, dry, hard / firm	None; unsuitable landing surface
Approach / Departure	Each 1268 m long X 50 m wide	

An LZ can be a good DZ, but a DZ may not be a good LZ.

If a helicopter cannot land, it might drop supplies by slow pass or hovering.

<u>The area must be clear of vertical obstructions.</u>

The pilot in command has final say about using any LZ

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Advisory Note

This lesson is confined to non-radio GTA signals to support LZ / DZ operations.

There are many other LZ / DZ duties which are beyond the scope of this lesson.

If you are not specifically trained in LZ / DZ operations, do not give any other hand signals to the aircrew.

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Upon Helicopter Arrival

If it is safe to use, point to the LZ / DZ.

Land Here;
point to LZ

Do not use any other gestures. Do not mislead the pilot into thinking you know more than you do.

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Advisory Notes

GTA signal panels must be securely fastened to keep them from being blown away. Helicopter rotor downwash can reach hurricane velocity.

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Provide Gesture Signals As Needed

Wave off if the LZ / DZ is unsafe.

If the LZ / DZ becomes unsafe for any reason, signal the aircraft ***NOT TO LAND***.

Unsafe; Do Not Land

Can use this for landing and take-off

Do not use any other gestures. Do not mislead the pilot into thinking you know more than you do.

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Unsafe DZ Conditions

- Obstructions / obstacles in the DZ. These can be objects sticking above the surface presenting a hazard to the aircraft.
- Wires (telephone, electrical lines, etc.)
- Wind gusts at 20 knots or more;
- Winds blowing at 45 knots or more;
- LZ is muddy
- LZ is covered with loose debris

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Drop Zone Operations

If the helicopter cannot land safely, it may drop supplies to you. This can be done in two basic ways.

Slow pass drop

Hover drop

Keep people away from the drop zone to avoid injuries from falling objects.

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Drop Zone Operations

A slow pass can be done at high or low altitude.

High slow pass drop

Low slow pass drop

Keep people away from the drop zone to avoid injuries from falling objects.

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Drop Zone Operations

Find an open area for the aircrew to safely drop supplies without landing. This area must be clear of vertical obstructions.

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Keep people away from the drop zone to avoid injuries from falling objects.

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Drop Zone Operations

A hover drop can be done at high or low altitude.

High hover drop

Low hover drop

Keep people away from the drop zone to avoid injuries from falling objects.

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If the helicopter is going to land

If it is safe to land, point to the LZ / DZ.

Land Here;
point to LZ

Do not use any other gestures. Do not mislead the pilot into thinking you know more than you do.

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To Stop the Helicopter from Landing

If the LZ / DZ is unsafe use the “wave off” signal.

If the LZ / DZ becomes unsafe for any reason, signal the aircraft ***NOT TO LAND***.

Unsafe; Do Not Land

Can use this for landing and take-off

Do not use any other gestures. Do not mislead the pilot into thinking you know more than you do.

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Unsafe LZ Conditions

- Obstructions / obstacles in the LZ . These can be objects sticking above the surface taller than 30 cm.
- Wires (telephone, electrical lines, etc.)
- Wind gusts at 20 knots or more;
- Winds blowing at 45 knots or more;
- LZ is flooded or muddy;
- LZ is covered with loose debris

Help keep the aircrew safe (or they may not be able to help you).

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Landing Zone Security

Keep everyone at least 50 m away from the helicopter. The aircrew is in charge.

Keep people away from the aircraft.
Do not allow people to touch the aircraft.

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Advisory Note

This lesson is confined to non-radio GTA signals to support LZ / DZ operations.

There are many other LZ / DZ duties which are beyond the scope of this lesson.

In an emergency, the aircrew or other authorities may request you to perform other duties. Use your discretion.
Do not exceed your capabilities with tasks involving the lives of others.

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Advisory Note

A helicopter may land relief / rescue workers.

- Be prepared to let these professionals take control of the LZ / DZ. They have special training and equipment for disasters and emergencies.
- Be prepared to work with them, following their instructions and orders.

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This Concludes This Series

Thank you for your attention and interest in our lessons.

See Note # 3 after the end of this presentation for other RTC-TH Lessons.

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Questions or Comments

We are always trying to improve our lessons. Your constructive comments and suggestions are welcomed.

You may contact us by e-mail:
hs0zhm@gmail.com

Please tell us how you heard about us and the lessons of interest to you.

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For More Information about RTC-TH EmComm Lessons

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Author / Mentor
Geography Professor Emeritus

Via E-mail
hs0zhm@gmail.com

Via Skype video
conference call: rtc_th

Lesson Archives: www.neighborhoodlink.com/RTC-TH_Tech/pages

FFI: Other *free* RTC-TH lessons see Note #19 after the end of this presentation.

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Community-based Environmental Education for

Self-sufficiency and Sustainability for Small Rural Family Farms

RTC-Thailand

Rural Training Center-Thailand

The End

Continue past this slide to get to the Notes mentioned in the presentation.

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Note #1: About the Rural Training Center-Thailand (RTC-TH)

We are an all volunteer organization providing community-based environmental education for self-sufficiency and sustainability of small rural family farms. We receive no government or outside funding.
We believe in what we do.
We spend our own money to do it.

www.neighborhoodlink.com/org/rtcth

E-mail: rtc2k5@gmail.com

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The Rural Training Center-Thailand was created to honor the life and memory of Mr. Tang Suttisan (a father of one of our co-founders), farmer and former custodian of Ban Na Fa Elementary School who appreciated and valued education.

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The RTC-TH EmComm Program

is a volunteer effort to provide emergency amateur radio communications for local community self-sufficiency and sustainability in times of need.

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The RTC-TH EmComm GECO Program

is a volunteer effort to provide remote rural area hams without formal EmComm training a bare bones guide for single-handed emergency communications operations.

When disaster strikes, a lone rural hobbyist ham may suddenly become an “accidental” EmComm ham. GECO strives to give the “accidental” ham some minimal systematic EmComm operating guide lines.

E-mail: hs0zhm@gmail.com

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The Gecko in GECO

We admire the ability of this lizard to cling tenaciously to walls and ceilings.
We hope grassroots emergency communication operators will be equally tenacious in serving their communities.

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Note #2 Make a Megaphone from a Discarded Cup

We carefully cut the bottom out of the cup.

This simple megaphone is better than cupping your hands and shouting. It also serves another purpose.

You can also use it as a "bat ear" to listen for approaching aircraft.

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Note #3: Other Free RTC-TH Lessons

The Rural Training Center-Thailand has a diverse catalog of lessons for rural families at http://www.neighborhoodlink.com/RTC-TH_Tech/pages

Community-based Education: Alternative learning methods for teachers, parents, students;

Applied Geography: Field survey methods for local villagers and students

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Other Free RTC-TH Lessons

Save Our Individual Livelihood:
Lessons for the self-sufficiency and sustainability of small, rural, family farms

Mobile Emergency Weather Station:
Systematic weather observations *from* remote disaster sites to support relief helicopter flight operations

GECO stations should seriously consider using MEWS.
It can also be useful for sustainable agriculture.

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MEWS Lesson Series

Orientation

Basic

Advanced

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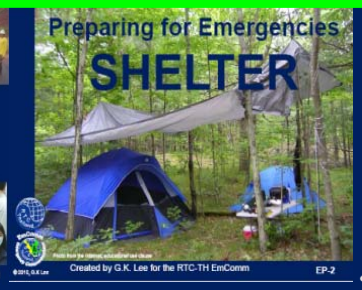
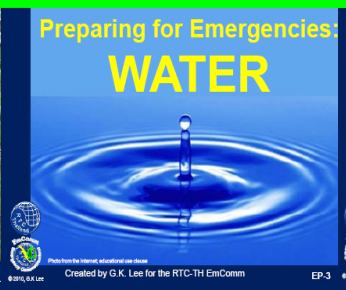
The Emergency Preparedness Lesson Series

Completed and available

EP-1



EP-2



EP-3

EP-4

EP-5

EP-6

EP-7

EP-8

EP-9

EP-10

EP-11

EP-12

In Development

All lessons can be adapted to any location on Earth using the Geographic Systems Model.

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Community-based Environmental Education for

Self-Sufficiency and Sustainability for Small Rural Family Farms

RTC-Thailand

Rural Training Center-Thailand

The End

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