Rural Training Center – Thailand (RTC-TH)



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

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M.E.W.S.

Mobile Emergency Weather Station





GAREC 2012 Edition V3



2012, G. K Lee HSØZHM An Emergency Communications Program of the Rural Training Center-Thailand Ready to serve and sustain our community

For other lessons in the series e-mail hs@zhm@cmail.c.

HSØZHN

A part of the RTC-TH EmComm Program

The Rural Training Center-Thailand Emergency Communications program is a volunteer effort to provide emergency





ISØ7HM

amateur radio communications for local community self-sufficiency and sustainability in times of need.

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The Rural Training Center-Thailand (RTC-TH)



is an all volunteer organization providing community-based environmental education for self-sufficiency and sustainability of small rural family farms

www.neighborhoodlink.com/org/rtcth

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

MEWS adapts weather lessons from 2 existing RTC-TH programs





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E-mail: <u>hsØzhm@gmail.com</u> www.neighborhoodlink.com/rtc-th_Tech/pages

MEWS in the News

In Apr 2011 MEWS was presented to Radio Amateur Society of Thailand and the world as a Thai New Year gift to all hams.

Two ham internet sites saw fit to announce MEWS to the world.





http://forums.qrz.com/showthread.php?293778-Mobile-Emergency-Weather-Station-Complete-quot-How-to-build-and-use-quot



MEWS on Hamuniverse.com <u>http://www.hamuniverse.com/hs0zhmmewslessons.html</u> Sparky the RTC-TH MEWS unit <u>http://www.hamuniverse.com/hs0zhmsparky.html</u>



The Need





Disasters disrupt existing infrastructures. Damaged roads cut access, stopping and slowing relief to stricken areas.

The Need

Water, food, sanitation, energy, transportation, and communications are often in ruin or short supply after a disaster.



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Photos from the Internet; educational fair use clause

Weather conditions can affect transportation, routing, and delivery of relief supplies.









Photos from the Internet; educational fair use clause

Weather Data For Relief Operations





Weather conditions affect survivors need for water, food, shelter, and medical aid as well as the locations of safe zones.



The Need

Sometimes there is not much left at all.



Photos from the Internet; educational fair use clause



The Need

Emergency relief workers often lack accurate on-site information especially from isolated areas







When disaster strikes, site specific weather data may not be available.

Photo from the Internet; educational fair use clause

Helicopters are important in relief operations





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Helicopters bring in critical supplies and experts



Comm

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Photos from the In

Photos from the Internet; educational fair use clause

Helicopters evacuate the seriously injured



Most helicopters operate only by Visual Flight Rules; Pilots must see the ground

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Commu

Weather conditions affect emergency helicopter flight operations.



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Ask a pilot



"When flying to an unfamiliar disaster area, would you prefer some weather data or NO weather data from the disaster zone?"

MEWS enables hams to provide the weather data.





The pilot in command decides how to make use of it. Hams don't control the flight.

MEWS can help avoid this



Flying into unfamiliar terrain without weather data increases the dangers for relief helicopter flight crews



Amateur radio operators (hams) have always been ready to serve their communities in times of need



Photos from the Internet; educational fair use clause





Hams are equipped for EmComm (Emergency Communications)



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They have a self-contained portable radio station: radio, antenna, power supply, and a trained operator.

Hams are equipped for EmComm





They can be prepared for extended deployment with their own tents and daily living supplies.

Amateur radio operators (hams) who are MEWS trained and equipped to make weather observations become more valuable community emergency response team members.



RTC-TH MEWS Operating Modes Each operational mode has advantages / disadvantages and costs.





Basic and Advanced MEWS can be done in any mode. However, Advanced equipment suitable for pedestrian and bicycle modes can be expensive.

Operational Scenario

The soft spot in the MEWS operational scenario: hams operating on amateur frequencies may not be able to communicate directly with relief helicopter crews

MEWS field unit reports via VHF or HF







© 2012, G. K Lee HSØZHM Direct communications between MEWS hams and flight crews reduces time to get data especially to support emergency helicopter landing zone operations in the disaster area.



relief authorities and aircraft



Relief Helicopter

The MEWS enHAMcement







M.E.W.S. Mobile Energency Weather HITCOMM HITCOMM Emergency Weather HITCOMM HI

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MEWS enhances a ham with basic weather observation training and equipment





The RTC-TH Approach No Tech / Low Tech Weather Observations





© 2012, G. K Lee HSØZHM By keeping it simple, there is low cost, less equipment to break, malfunction, or run out of power, and less maintenance.

The MEWS Weather **Observation Log** has highlighted notes to guide making observations with minimal training. Detailed instructions are in the MEWS manual

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Instructional notes let you make MEWS observations with minimal training

	2.1	Air (Dry bulb)	Thermometer in shade; 1.5	℃
dity	2.2	Wet Bulb	ni above ground	°C
Humidity	2.3	Difference	Subtract 2.2 from 2.1;	°C
ive F	2.4	4 Rel. Humidity Use 2.1, 2.3; R H Table		%RH
telat	2.5	Dew Point Use 2.1, 2.3; Dew Pt Table		°C
e/F			Use 2.1, 2.4 ; HSI Table	Heat Stress °C
Temperature / Relative	2.6	Heat Stress	Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr
emp			Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C
2. T	2.7	Wind Chill	Danger Level (if any from Wind Chill chart)	□TrvI Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5



2.1 Get air temp 2.2 Get wet bulb temp 2.3 Subtract 2.2 from 2.1 and record 2.4 Look up % RH in table using 2.1 and 2.3; and record % RH

The MEWS Weather **Observation Log** back of form has expanded notes for doing observations with minimal training.

Detailed instructions are in the MEWS handbook

All weather observers write their initials and clearly print their name using block letters

M.E.W.S. Summary Weather Observation Log Instructions RTC-TH M.E.W.S. Weather Observation Log

Ready to sen

and sustain ou

community

ocation

Local time

24-hr format

DØSERVET (initial: see kark)

Hour-

Header

Location: Local Place Name

Latitude, Longitude from GPS, survey records or

map measurement.

Elevation: Survey records or map measurement

(GPS elevations are not reliable).

Date/Hour: Use local Thai standard time in Observer: initials in box. Full name (print clearly) on top/back of form 24-hour format

Temperature / Relative Humidity

- 2.1 Air (Dry Bulb) Temp: Read thermometer kept in the shade, 1.5 m above the ground.
- 2.2 Wet Bulb Temp from hyrgrometer kept in the shade, 1.5 m above the ground.
- 2.3 Difference between Dry and Wet Bulb temperatures.

I	Air (Dry buib)	Thermometer in shade; 1.5		- V	- °C		
2.2	Wet Bulb	m above ground	°C	9°	*C		
2.3	Difference	Subtract 2.2 from 2.1;	°C	° C	°C		
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH		
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	° C	*C		
		Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress *C	Heat Stress °C		
2.6	Heat Stress	Danger Level (if any from Heat Stress Index table)	oCautn oDanger o Ex Cautn oEx Dangr	o Cautin o Dangar o Ex Cautin o Ex Dangr	o Caute o Danger o Ex Caute o Ex Dangr		
		Use 2.1, 3.1; Wind Chi Tbl	Wind Chil. °C	Wind Chill. *C	Wind Chil. °C		
2.7	Wind Chill	Danger Level (if any from Wind Chill charf)			a Trvi Dingr a Fratble 10 a TShitr Dgr a Fratble 30 a Frastbite a Fratble 5		
	10.01			1.4/ 5 1.//			

Sunrise

Weather Observations Time

Sunse

Mid-Afternoon

2.4 Relative Humidity: Use Dry Bulb Temp (2.1), Difference (2.3) and Relative Humidity table to find % Relative Humidity.

2.5 Dew Point Temperature: Use Dry Bulb Temp (2.1), Difference (2.3) and Dew Point Temp table to find Dew Point Temp.

2.6 Heat Stress Temperature: Use Dry Bulb Temp (2.1), % Relative Humidity (2.4) and Heat Stress Index Table to find Heat Stress Temperature and relevant advisory warning.

2.7 Wind Chill: Use the Dry Bulb Temp (2.1) and Wind Speed (3.1) and Wind Chill Table to find the Wind Chill Temperature and relevant advisory warning.

Wind Speed / Direction

3.1 Average and Gust Wind speeds: Use Beaufort Table or direct measurements 3 times and average results. Gusts are short, strong blasts of wind. Report wind speeds in knots to air crews. Advise air crews when wind speeds are close to affecting helicopter flight operations.

	3.1	Report wind speed in knots to air crews; km/h to all others.													
Mind Speed/Direction		Average	Get 3 readings & average		km/h		kata kan/h			krts km/r		krta			
		Guete	Record highest gust		km/h		knts		in/h		krb.		km/h		krts
B	I .	Wind Speed Guidelines for Helicopter Flight Operations													
18	l '	10 kno	ts / 18.5 km/h ideal; OK	to fi)			Á	bove	45 kr	nots /	83 ki	m/h; 1	No fli	ights.	
E	· ·	Gusts abo	ive 20 knots/ 37 km/h; N	Jo flig	hts		Max	taiv	rind 5	knot	ts/6 k	an/hr,	No	take (aff
12		Steady Wind	Circle direction steady wind	N	NE	3	SW	N	NE	9	SW	N	NE	5	SW
	32	Direction	comes FROM	E	SE	W	NW	E	SE	w	NW	E	SE	w	NW
1	32	Variable Wind	Circle 1 or more directions	N	NE	3	SW	N	NE	3	S₩	N	NE	5	SW
		Direction	wind comes FROM	E	SE	w	NW	E	SE	w	NW	E	SE	W	NW

3.2 Steady or Variably blowing winds. If steady, circle letter for direction. If variable, circle all appropriate letters for directions

Cloud Cov

Sky Conditions

- 4.1 Cloud cover: Look at the sky and follow the definitions for each cloud cover classification.
- 4.2 Cloud Base Height: If relative to a local mountain, give its name and elevation above mean sea level. Note Local Relief in meters. If using the Dew Point method, subtract Dew point temp (2.5) from Dry temp (2.1) and divide result by 9.8; multiply quotient by 1000m. Advise air crews when cloud base height (ceiling) are close to affecting helicopter flight operations.
- 4.3 Cloud Type: Check the appropriate box based on cloud description in the guide book



- 4.4 Rainfall: Measure water in rain gauge each day at 0900 hrs. Rain gauge should be in open area, away from tall objects with top of gauge 50 cm above ground to avoid splash water from entering gauge.
- 4.5 Visual Range: Pick landmarks 3.2 km and 5 km from your observation site. Report when visual range is more or less than the known distances to these landmarks. Advise air crews when visual range is close to affecting helicopter flight operations. Check appropriate boxes for reasons of reduced visibility.
- 4.6 Severe Weather: Primary concerns and thunderstorms and lightning. Check the appropriate boxes. If lighting, watch for flash, count seconds until you hear the thunder, divide by 3 = approximate distance in km. Circle direction to storm

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Basic MEWS PDF Lessons

- **B 1: Measuring Temperature**
- **B 2: Estimating Wind Speed**
- **B 3: Measuring Wind Direction**
- **B 4: Estimating Cloud Cover**
- **B 5: Estimating Cloud Base Height**
- B 6: Identifying Cloud Types
- **B 7: Estimating Visual Range**

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B 8: Severe Weather Conditions

Basic MEWS PDF Lessons





HSØZHM

3 Orientation and 8 Basic lessons. Some show how to build your own weather equipment. Basic MEWS Weather Observer Tasks Basic weather observations are systematic relative / subjective estimates linked to standard reference cards.

- Temperature (measured)
- Estimate Wind Speed
- Wind direction
- Cloud cover
- Estimate cloud height
- Visibility
- Thunder / Lightning

 Useful for planning and setting priorities according to local environmental conditions

• Give general flight weather data at the landing zone



The Basic MEWS Weather Observer's kit

Thermometer







Magnetic compass (optional)



Basic Reference tables

Flag & Umbrella (optional)

Basic MEWS Observations are recorded here on the Log Form

2.1 Temperature 3.1 Estimate Wind Speed 3.2 Wind direction 4.1 Cloud cover 4.2 Estimate cloud height 4.5 Visibility 4.6 Thunder / Lightning Detailed instructions are in

the MEWS handbook

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	_	144	RTC-TH M.E.W.S. Weather Observation Log									
M.E.		W.S.	Location									
		5 L	Lat °	"	l Lon	g °	" "Е					
bile	77	* Statio	Lat	Ν		v	E	Elev	m AM			
E	allar	y Weather ₽	Date			<i>.</i>	ather Obser	vations	Time			
	gend	y Wear			Su	unrise	Mid-Afte		1	nset		
	~	to serve	Local time	Hour→								
a		stain our	24-hr format									
	comn	nunity.	Observer (ir	nitial; see back)								
	2.1	Air (Dry bulb)	Thermomet	er in shade: 1.5		°C		°C		°C		
AL.	2	Wet Bulb	m abo	ve ground		°C		°C		°C		
Hun	2.3	Difference	Subtract	2.2 from 2.1;		°C		°C		°C		
ve H	2.4	Rel. Humidity	/ Use 2.1, 2	2.3; R H Table		%RH		%RH		%RH		
Relative I	2.5	Dew Point	Use 2.1, 2.3	3; Dew Pt Table		°C		°C		°C		
9 / R(Use 2.1.2	.4 ; HSI Table	Heat Stre		Heat Stress	0°C	Heat Stress			
ature	2.6	Heat Stress		vel (if any from	□Cautn	Danger		Danger	Cautn	Danger		
pera			Heat Stres	ss Index table)	🗆 Ex Cau	tn □Ex Dangr	🗆 Ex Cautn 🛛		🗆 Ex Cautn	□Ex Dangr		
Temperature /			Use 2.1, 3.	1; Wind Chl Tbl	Wind Chil		Wind Chill.	°C	Wind Chill.	°C		
	2.7	Wind Chill	Danger Le	vel (if any from	TrvI Dngr	r DFrstbte10 r DFrstite30		□Frstbte10 □Frstite30	□Trvl Dngr □TShltr Dgr	 Frstbte10 Frstite30 		
2.			Wind Chill chart)			r ⊡Frstite30 □Frstbte5	□TShltr Dgr □Frostbite		□ Frostbite			
	I		Repo	ort wind speed					s.			
5		Average	Get 3 readings & average									
Je		-			km/	h knts	km/h	knts	km/h	knt		
/ Di	3.1	Gusts		highest gust	km/		km/h	knts	km/h	knts		
Vind Speed / Dire		101			Ielines for Helicopter Flight Operations							
ld Sp		10 knots / 18.5 km/h ideal; OK Gusts above 20 knots/ 37 km/h; N										
Nir	<u> </u>	Steady Wind		ion steady wind	N NE		N NE	S SW	N NE S SW			
3.	3.2	Direction		es FROM	E SE		E SE	W NW	E SE	W NW		
	5.2	Variable Wind	Circle 1 or more directions		N NE		N NE	S SW	N NE	S SW		
		Direction	wind co	mes FROM	E SE		E SE	W NW	E SE	W NW		
	4.1	Cloud Cover	Cloud Cover		 Clear Scatter 	□ Cloudy ed □ Overcast	Clear Clear Scattered	□ Cloudy □ Overcast	Clear Cloudy Scattered Overcast			
			Cover Table Broken Broken						Broken			
		Use local me Cloud Base Ht	al mountain of known elevation (ab				report clouds					
		(Loc Rel)	Relative	Relative to local Mtn		 Clouds above mtn Clouds at mtn top 		ntn top	 Clouds above mtn Clouds at mtn top 			
	4.2	· · ·	m AMSL m DewCal (2.1-2.5)/9.8x1000m Min. flight altitudes: Day = 160			below mtn	Clouds belo	ow mtn	Clouds below mtn			
					m A CL M	m AGL	Clubowala	m AGL	No finhte	m AG		
	L		win. ilight aititu	ues: Day = 160	MAGL; N		GL; LOW CIOU		No flights.	1		
ition			Middle	Vertically	🗆 Altostra		 Altostrat 	□CuNim	 Altostrat 	- CuNim		
onditions	4.3	Cloud Type	Midule	- Developed	 Altocun Stratus 		Altocum Stratus		Altocum Stratus	-		
			Low		 Stratus Nimstra 		 Stratus Nimstrat 	Cumul	 Stratus Nimstrat 	🗆 Cumul		
0,	4.4	Rainfall		re at 0900 hrs e						mr		
4.			Name of	3.2 km mark		less than			more	less than		
		Visual Range			□ Rain □ Haze	□ Fog □ Smoke		Fog Smoke		⊐ Fog ⊐ Smoke		
	4.5	(Visibility)			more	less than	more	less than	in more	less than		
					□ Rain	Fog	□ Rain □	Fog	□ Rain ।	⊐ Fog		
		Helico	pter minimum	visibility: Dav = 3	3.2 km / 2 l	miles: Niaht =	5 km / 3 miles	: Low visit	bility = No fl	ahts		
			Thund	derstorms	🗆 Yes	🗆 No	🗆 Yes	🗆 No	🗆 Yes	🗆 No		
	4.6	Severe	Lightning	Lightning Flash, count secs to boom / 3		E S SW W NW	N NE E SE S			S SW W NW		
		Weather			□ Yes	km	□ Yes	km	□ Yes	km		
								1				

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The MEWS Weather Observation Log





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has highlighted items critical for helicopter flight operations.

	E	W.	L	RTC-TH M.E.W.S. Weather Observation Log							
	M.E.W.S		L	Location							
	3	5		Lat °	" " N	Long	0	" Е			
		Pr Statio		Lat	N	Long		E	Elev		m AMSL
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	gen	cy Weathe	-			Sunr			ternoon	Sur	isat
		to serve	H	Local time		Juli	150	WING-741	emoon	Jui	1501
	-	stain our		24-hr format	Hour→						
	comn	nunity.	Г	Observer (initi	al: see back)						
	0.1										
	2.1	(= .)		Thermometer m above			°C		°C		°C
tibi	2.2	Wet Bulb		III abuve	ground	°C		°C		°C	
- Human	2.3			Subtract 2.3	2 from 2.1;		°C		°C		°C
1 01	2.4			Use 2.1, 2.3	; R H Table		%RH		%RH		%RH
olati	2.5	Dew Point	-	Use 2.1, 2.3; I	Dew Pt Table		°C		°C		°C
d/D				Use 2.1, 2.4	: HSI Table	Heat Stress	°C	Heat Stress		Heat Stress	
ture	2.6	Heat Stress	S	Danger Leve	·		Danger	□Cautn	Danger		Danger
DOPS				Heat Stress		🗆 Ex Cautn			□Ex Dangr	🗆 Ex Cautn	
Tomnoraturo / Do latino. Humidity	u a			Use 2.1, 3.1;	Wind Chl Tbl	Wind Chill.	°C	Wind Chill.	°C	Wind Chill.	°C
	2.7	Wind Chill		Danger Leve	l (if any from		□Frstbte10	Trvl Dngr	□Frstbte10	Trvl Dngr	□Frstbte10
ç	i.			Wind Chill chart)			□Frstite30	□TShltr Dgr	□Frstite30	TShltr Dgr Froatbite	□Frstite30
				Report	wind speed	l in knots t	o air crev	ws; km/h t	o all others	S.	
10	5	Average		Get 3 reading	s & average						
notion	er.		_			km/h	knts	km/h	knts	km/h	knts
	2.1	Gusts		Record hid			 DUTW		n . DEDAR		i i tuttar
Wind Speed Guidelines for Helicopter Flight Operat											
				ots / 18.5 km/				bove 45 kr		n/h; No flig	·
Vind											
					/ 37 km/h; N			tailwind 5		· · · · · · · · · · · · · · · · · · ·	
		Oleauy Will			i steauy winu	E SE	0 000		0 077	m/hr; No ta	0 000
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		Direction	ū	comes	FROM bre directions	E SE N NE E SE	W NW S SW W NW	E SE N NE E SE	W NW S SW W NW	E SE N NE E SE	W NW S SW W NW
	⇒ 3.2	Direction Variable Wir Direction	nd	Circle direction comes Circle 1 or mo	FROM FROM ore directions es FROM	E SE N NE E SE	W NW S SW W NW	E SE N NE E SE	W NW S SW W NW	E SE N NE E SE Clear	W NW S SW W NW
		Direction Variable Wir	nd	Circle 1 or mo Wind com	FROM ore directions es FROM ons in Cloud	E SE N NE E SE	W NW S SW W NW	E SE N NE E SE	W NW S SW W NW	E SE N NE E SE	W NW S SW W NW
	⇒ 3.2	Direction Variable Wir Direction Voud Cove	nd er	Circle direction comes Circle 1 or mo wind com Use Definitio Cover untain of known	FROM FROM ore directions es FROM ons in Cloud Table elevation (abo	E SE N NE E SE Clear Broken Ove mean sea	W NW S SW W NW Cloudy Overcast	E SE N NE E SE Clear Scattered Roken report clouds	W NW S SW W NW Cloudy Overcast s above, at, c	E SE N NE E SE Clear Scattered Broken	W NW S SW W NW Cloudy Overcast
	⇒ 3.2	Oteady Win Direction Variable Wir Direction Noud Cove Use local n	nd er	Circle 1 or mo Circle 1 or mo Wind com	FROM FROM ore directions es FROM ons in Cloud Table elevation (abo	E SE N NE E SE Clear Scattered Roken Ove mean sea	W NW S SW W NW Cloudy Overcast	E SE N NE E SE Clear Scattered Broken report clouds Ulouds at	W NW S SW W NW Cloudy Overcast s above, at, c	E SE N NE E SE Clear Scattered Broken or below mou	W NW S SW W NW Cloudy Overcast
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	2 3.2 4.1	Direction Variable Wir Direction Youd Cove Use local m Youg pase r You Rel)	nd er mo m	Circle direction comes Circle 1 or mc wind com Use Definitic Cover untain of known Relative to DewCal (2.1-2.	re directions es FROM ons in Cloud Table elevation (abo incert min m AMSL 5/19.8x1000m	E SE N NE E SE Clear Broken Ve mean sea Clouds abr Clouds abr	W NW S SW W NW Cloudy Overcast Ievel) and over min nth top ow mtn m AGL	E SE N NE E SE Clear Scattered Roken Port clouds Clouds at Clouds at	W NW S SW W NW Cloudy Overcast S above, at, c pove min mth top elow mth m AGL	E SE N NE E SE Clear Scattered Broken Douds at Clouds at Clouds at	W NW S SW W NW Cloudy Overcast
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Wind Advisory Notes for Helicopters

	3.1	Report wind speed in knots to air crews; km/h to all others.									
Speed / Direction		Average	Get 3 readings & average	km/h	knis	km/h	knis	km/h	knts		
		Gusts	Record highest gust	km/h	knts	km/h	knis	km/h	knts		
		Wind Speed Guidelines for Helicopter Flight Operations									
		10 knot	ts / 18.5 km/h ideal; OK	Above 45 knots / 83 km/h; No flights.							
Wind		Gusts above 20 knots/ 37 km/h; No flights Max tailwind 5 knots/ 6 km/hr; No take off									
3. W	3.2 ·	Steady Wind	Circle direction steady Wind	N NE	S SW	N NE	S SW	N NE	S SW		
		Direction	comes FROM	E SE	W NW	E SE	W NW	E SE	W NW		
		Variable Wind	Circle 1 or more directions	N NE	S SW	N NE	S SW	N NE	S SW		
		Direction	wind comes FROM	E SE	W NW	E SE	W NW	E SE	W NW		

Operating limits are on the form for ready reference
Color coded for OK or warning
Operator looks at form, reads off weather data and relevant flight crew warning.



HSØ7HN

Advanced MEWS PDF Lessons

A 1: Measuring Relative Humidity and Heat Stress

- A 2: Measuring Wind Speed and Wind Chill
- A 3: Using Dew Point Temperature to Calculate Cloud Base Height
- A 4: Measuring Rainfall
- A 5: Reporting Severe Weather
- A 6: Weather Forecasting



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Advanced MEWS PDF Lessons





HSØZHM

6 slide show lessons Some show how to build your own weather equipment

Advanced MEWS Weather Observer Tasks

All the Basic observations plus:

- Relative Humidity
- Dew Point
- Heat Stress Index
- Wind Chill Factor
- Measured wind speed
- Calculate cloud height
- Cloud type
- Rainfall



- More detailed local environmental conditions affecting survivors
- More accurate cloud ceiling which could affect flight operations
- Give measured flight weather data at the landing zone
- Gives basic weather forecasting capability

Advanced Weather Observer's kit Dwyer wind gauge Rain Hygrometer Gauge Heat Stress emperati//e Wind Velocity Conversion Table Kinin Kingta J.L.T. 0.869 8.69 CONCESSION 1 -8 -2 -9 60 -2 -0 -57 -57 -9 84 -5A Calculator revel can be dangemu Postbite within 30 minutes



In addition to all Basic MEWS materials

Advanced Reference tables

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Advanced MEWS Observations are recorded here on the Log Form

2.2 / 2.3 Temp calculations 2.4 Relative Humidity 2.5 Dew Point 2.6 Heat Stress Index-2.7 Wind Chill Factor 3.1 Measured wind speed 4.2 Calculate cloud height 4.3 Cloud type 4.4 Rainfall

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	bile	コン	Stati	Header	Lat	Ν	l Long		E	Elev		m AMSL
	E	alla	nd me	<u>ا</u> گا	Date			Wea	ther Obse	rvations	Time	
		gen	cy Weather			Sun		rise	Mid-Aft	ernoon	Sun	set
		~	to serve	†	Local time	Hour→						
		and sustain our community. 2.1 Air (Dry bulb 2.2 Wet Bulb			24-hr format	11001 y						
					Observer (i	nitial; see back)						
				ulb)	Thermome	ter in shade: 1.5		°C		°C		°C
Ĩ	dity			lb	m above ground		°C		°C		°C	
		2.3 Difference Subtract 2.2 from 2.1;			°C		°C	°C				
2	le P	2.4	Rel. Humi	idity				%RH		%RH		%RH
3		2.5	Dew Po	int				°C		°C		°C
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						Chill chart)	□Frostbite	□Frstbte5	□Frostbite	□Frstbte5	□Frostbite	
					Repo	ort wind speed	l in knots	to air cre	ws; km/h to	o all others	S.	
	rection		Averag	Average		lings & average	km/h	knts	km/h	knts	km/h	knts
Ζ	.ec	3.1	Gusts		Record	highest gust	km/h	knts	km/h	knts	km/h	knts
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	ind		Gusts	s ab	ove 20 kno	ots/ 37 km/h; N	lo flights	Max	tailwind 5	knots/6 k	m/hr; No ta	ke off
	3		Steady Wind			tion steady wind	N NE	S SW	N NE	S SW	N NE	S SW
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		4.1	Cloud Cover		Use Definitions in Cloud Cover Table		🗆 Clear	Cloudy		Cloudy		Cloudy
		4.1					Scattered Overcast Roken		Scattered Overcast Broken		Scattered Overcast Broken	
			Use loca			wn elevation (ab	ove mean sea level) and i		report clouds above, at, o		or below mountain top.	
			Cloud Base Ht		Relative to local Mtn		 Clouds above mtn Clouds at mtn top 		Clouds above mtn Clouds at atta tan		 Clouds above mtn Clouds at mtn top 	
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				m	DewCal (2.	1-2.5)/9.8x1000m		m AGL		m AGL	_	m AGL
				Min. flight altitudes: Day = 160m AGL; Night – 500 m AGL; Low cloud ceiling = No flights.								
	SU				nign		Altostrat	□CuNim	Altostrat	□CuNim ·	Altostrat	□CuNim
	ur U	4.3	Cloud Ty	/pe	Middle	Vertically Developed	□ Altocum		□ Altocum		□ Altocum	
	ky Cont				Low	Dorotopou	Stratus	Cumul	Stratus	Cumul	Stratus	🗆 Cumul
		1.4	Rainfa	1	Measure at 0900 hrs e		ach morning	. Report am	ount for last 2	24 hrs.		mm
	4.		Name of 3.2 km mark		r 3.2 km mark	i more i	liess than		Fog		less than	
							D .				🗆 Rain 🗆	Fog
1			Visual Ra	nae				⊐ Fog ⊐ Smoke				Smoke
		4.5	Visual Ra (Visibilit		Name o	f 3.2 km mark	Haze more	Smoke less than	Haze more	Smoke less than	Haze more	Smoke less than
		4.5			Name o	f 3.2 km mark	□ Haze (□ more (□ Rain (Smoke less than Fog 	□ Haze □ □ more □ □ Rain □	Smoke less than Fog	Haze more Rain	less than Fog
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Detailed instructions are in the MEWS handbook

Other Advanced Equipment

Digital Thermometer

Sling Psychrometer











© 2012, G. K Lee HSØZHM Analog Weather Station Digital Weather Station

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Some HAMs may already have some of these

More Advanced Equipment



© 2012, G. K Lee HSØZHM Some HAMs may already have some of these

Even More Advanced Equipment

Portable Weather Station



APRS Weather Station



Photo from the Internet; educational use clause

This type of automated digital equipment could be added to MEWS if funds were available



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What Can You Do?

- If you are not a HAM
- Get involved
- Join a radio club
- Join a radio society
- Get a license
- Get a radio

If you are a HAM

- Join a radio club
- Join a radio society
- Learn EmComm
- Learn MEWS
- Make an
 - emergency plan
- Join or form an EmComm Team



You can learn MEWS free by mentor or self-study





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Mentoring can be done face-to-face (individually or in small groups on-site at cost) or free over the Internet









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Via E-mail hs0zhm@gmail.com

Via Skype video conference call: rtc_th

Free Self-Study Materials by Internet

 RTC-TH Weather Observer handbook
 Illustrated PDF topical lessons

All of the lessons have been classroom and field proven.

Send e-mail to hsØzhm@gmail.com to request free training materials for noncommercial use only.







These materials are in English. Volunteer assistance for translation to Thai is welcome and will be acknowledged and cited.

Questions or Comments

Refer to the MEWS Weather Observer Handbook for more details on any of the procedures in these lessons.





M.E.W.S. Mobile Entropy Sency Weath Emergency Communities Communities

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MEWS Empowers

Many survivors feel and act as helpless disaster victims



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Even children can quickly learn MEWS and help EmComm hams actively support the relief effort.



MEWS Before / After Disaster Strikes

Learning MEWS before a disaster is a practical way for students to use their classroom lessons in the real world to help their family farms.



MEWS procedures follow standard weather observation methods. People who learn MEWS get practical job skills.

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For More Information about M.E.W.S.



Via E-mail

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Contact Greg HSØZHM MEWS Creator / Mentor



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Via Skype video

conference call: rtc_th



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The Emergency Preparedness Lesson Series

These lessons were created for Nan Province, Thailand but hams can readily adapt them to their locations





www.neighborhoodlink.com/RTC-TH_Tech/pages

I EmComm, I didn't, therefore I am. therefore I am not





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Community-based Environmental Education for





Rural Training Center-Thailand <u>rtc2k5@gmail.com</u>

www.neighborhoodlink.com/rtc-th_Tech/Pages