

## HS3 Hurricane Evacuation Procedures

### AIRCRAFT AND EQUIPMENT:

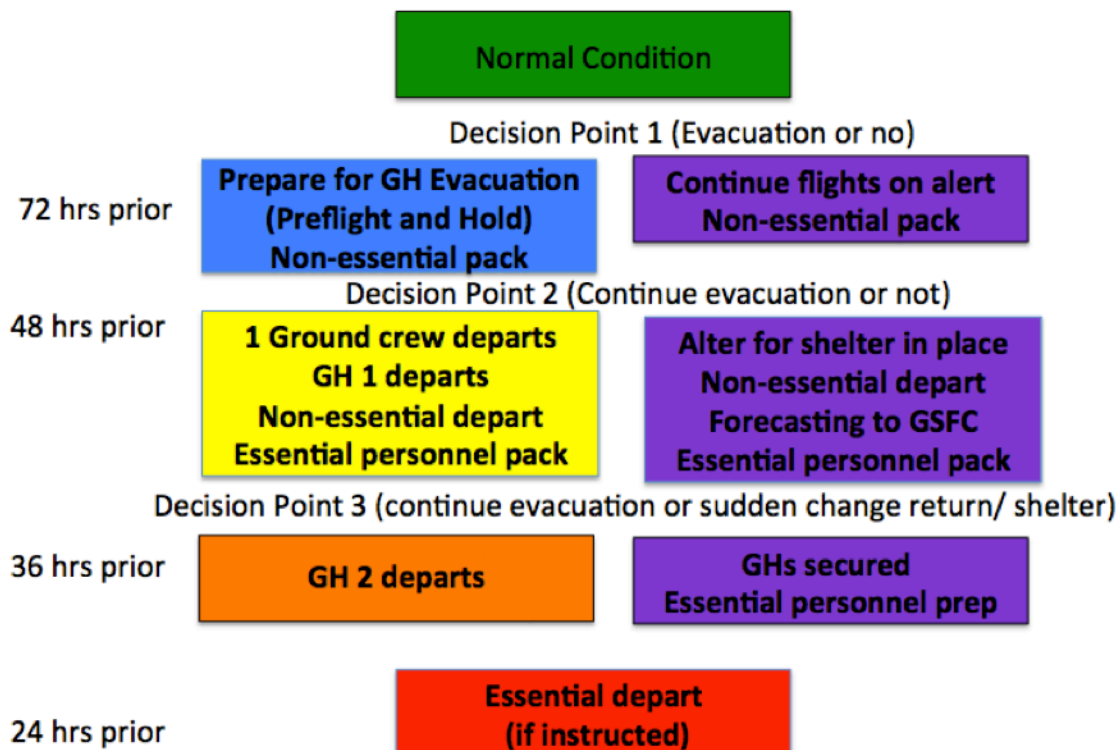
- Tropical Storm winds (winds > 39mph < 73 mph) would cause HS3 to suspend flights.
- Category 1-2 hurricane (winds > 74mph < 110 mph) would cause HS3 to suspend all operations, hangar the GHs and evacuate non-essential personnel.
- Category 3 or higher (winds > 111mph) would cause HS3 to evacuate the aircraft and evacuate all personnel.

It is important to consider that, if WFF is in the path of any storm it may intensify, so evacuation must be considered even if only a Cat 1 or tropical storm is predicted. There will be decision points where the HS3 Management Team stops to consider the storm situation and risk to personnel, aircraft and ground equipment.

**DECISION POINT AT 72 hours prior.** This decision depends on forecasted track and intensity but if WFF is close to the storm track, the risk of the storm turning or intensifying must be considered. If the PIC and Mission Scientist decide to evacuate the planes and personnel, begin the steps below (BLUE). The process can be stopped at any point if the conditions change. If the choice is to stay and the storm changes track or intensity to be a higher threat after 72 hours, the only option is to shelter aircraft in place (PURPLE). See table below.

The Project Office will have 2-3 personnel that will remain at WFF to complete the preparations for the landfall at the airport, but they may be required to leave if NASA WFF decides to declare a mandatory base closure. Equipment (that should be packed) will be stored in one of the safer rooms of the hangar. If the equipment is not packed, please do not assume that it will be packed for you. Communications from ESPO will be maintained as long as possible via phone, email and web. After the storm, ESPO will notify the HS3 team regarding the return schedule.

### Evacuation Decision Tree



**Level Green (Normal Condition):**

- Operations as normal
- Read this document
- Review your evacuation route
- Decide and document team evacuation plans

DECISION IS TO EVACUATE PLANES AND PERSONNEL...

**Level Blue (72 hours prior)**

- *Key decision point – Evacuate, shelter in place or remain in normal condition.*
- Need weather and modeler input.
- ESPO to meet with WFF Safety personnel
- GH crew chief to plan crew departures
- Mission personnel begin preparations for GH evacuation
- One ground crew makes travel plans/reservations for departure after GH 1 takeoff
- Fuel and prep GH 1 for daylight launch near 48hrs (depending on daylight)
- Fuel and prep GH 2.
- Confirm contact info with ESPO
- Review underlined items in this document
- Non-essential mission personnel bags packed
- Keep updated on forecasts
- Make air travel itinerary changes, if appropriate
- Archive / Back-up instrument data
- Organize any evacuation carpools
- Pack spares and test equipment not actively used
- Obtain prescriptions if needed
- Fill gas tank in car
- Withdraw cash from ATM
- ESPO activate satellite phones

**Level Yellow (48 hours prior)**

- *Key decision point – Continue evacuation or shelter in place or stop process*
- GH 1 departs for AFRC near 48hrs.
- Non-essential mission personnel evacuate (Forecasting and planning operations may be moved to GSFC)
- Essential mission personnel bags packed
- Teams pack all lab equipment
- Stay in close team contact
- One ground crew departs for AFRC to be able to send GHs back.
  - Carry VTC; borrow others' GSE and Tesla
- Review underlined items above

**Level Orange (36 hours prior):**

- *Key decision point – Continue evacuation or shelter in place or return GH1*
- GH 2 departs for AFRC near 31hrs (depending on daylight)
- GHOC-E transfers control of GH2 to GHOC at 30hrs
- Pay hotel charges
- Review local shelters for emergencies
- Most rental cars returned (Car / Vanpools organized)
- Review underlined items above

**Level Red (24 hours prior):**

- *Key decision point – Continue evacuation or shelter in place.*

- **Mandatory Evacuation!** Mission essential personnel evacuate.
- Return remaining rental cars

*WFF Condition Level 1* (12 hrs prior): Access restricted. Prepare to cut power.  
 Recovery: After WFF has announced an “All Clear” they will restore access.  
 ESPO will notify teams of the schedule for restoration of mission activities.

**-OR-**

DECISION IS NOT TO EVACUATE PLANES...

**Level Purple (72 hours prior):**

- Continue flights (on alert)
- Non-essential personnel pack

**Level Purple (48 hours prior):**

- Alert for shelter in place
- Non-essential personnel depart (if instructed)
- Forecasting team moves to GSFC (if instructed)
- Essential personnel pack

**Level Purple (36 hours prior):**

- Tie down GHs in Hangar (timing based on wind conditions) 36hrs prior.
- Essential personnel prepare for departure.

**Level Red (24 hours prior):**

- Essential personnel depart (if instructed).

Deployment continuation will be re-evaluated subject to WFF and regional damage and remaining schedule.

WFF has a standard practice of relocating all of its aircraft to inland airports (West Virginia) when a major storm approaches, provided that such aircraft are in flyable condition. Aircraft that are not flyable will likely be hangared. Visiting agencies, nearby agencies (e.g., Coast Guard) and WFF users of large equipment both on Wallops Island and on the flight facility will seek hangar space during a severe storm. The result is a high demand for hangar space. Global Hawk aircraft will have priority for D-1 hangar space during HS3 deployments, but GH equipment, including GSE, may find competition for hangar space if a storm is approaching. If a storm is approaching Wallops and poses potential harm to assets, Wallops management will determine hangar priorities. Ron Walsh is our liaison for that process.

Airfield support from WFF and EDW during off-hours can be pursued under emergency conditions. Exceptions to the Armstrong fatigue matrix can be pursued under emergency conditions. Instruments can be powered and operational during a transit. However, loitering over the approaching storm for science purposes is inconsistent with emergency evacuation. Investigating the storm and landing at Armstrong afterward is possible, but must be initiated even earlier than a direct transit, when storm path and intensity are even more uncertain. As a storm approaches and dual transits become a possibility, evacuation must be considered as early as 96 hours prior to storm arrival, so the planes are available at the planned evacuation times. After the first transit is initiated, we may be able to turn the GH around in the air and return to WFF. This would be worked real time with the FAA.

It is not likely that the Wallops Flight Facility will endure flooding, as it is over 30 feet above sea level. Wind is the primary threat. The WFF hangar, D-1, is designed to withstand severe storms, but there is a risk of flying glass and wind intrusion in such storms.

**PERSONNEL:**

This document provides guidelines for steps to take in the event that a hurricane is predicted to make landfall at Wallops Flight Facility where the HS3 mission operation will be based. Although the HS3 participants will be very familiar with the latest forecasts, the official HS3 Level of Readiness will be

posted in the lab area. Wallops Flight Facility has its own Hurricane Preparedness Plan, which can be found at: <http://sites.wff.nasa.gov/code803/docs/HurricanePlan.pdf>  
The HS3 Hurricane Preparedness Plan is based in part on the Wallops plan.

## 1. HS3 Hurricane Level of Readiness

The HS3 mission will indicate the hurricane's estimated time of impact by announcing a Level of Readiness alert. Five separate hurricane levels will be used to provide for orderly and thorough preparations to minimize the effects on personnel and property. Progress through these levels of readiness may not be as expected since the storm system may change course or intensify rapidly. It is possible to go from Level Blue to Level Orange directly, to ensure all the precautionary measures are executed as quickly as possible. The levels of readiness categories that will be used for the HS3 mission are:

**Level Green (Normal Condition during mission)**

**Level Blue (72 hours prior to estimated landfall)**

**Level Yellow (48 hours prior to estimated landfall)**

**Level Orange (36 hours prior to estimated landfall)**

**Level Red (24 hours prior to estimated landfall)**

Although the HS3 mission can remain and continue operations until 24 hours prior to estimated landfall, this permission applies to **critical mission essential personnel only** and does not include the majority of HS3 participants. All other HS3 personnel will follow the normal rules of the city of Chincoteague for visitors. They will follow publicly issued evacuation recommendations and orders.

## 2. Wallops Flight Facility Based Decisions

Hurricane categories denote hurricane intensity according to the Saffir/Simpson Scale. HS3 project responses will be tailored to match the risks. If Wallops is expected to take a direct hit from a Category 3 or higher hurricane, evacuees will be directed to move further inland.

Saffir/Simpson Scale:

**Category 1** – Winds of 74-95mph; Storm surge 4'-5' above normal

**Category 2** – Winds of 96-110 mph; Storm surge 6'-8' above normal

**Category 3** – Winds of 111-130 mph; Storm surge 9'-12' above normal

**Category 4** – Winds of 131-155 mph; Storm surge 13'-18' above normal

**Category 5** – Winds greater than 155 mph; Storm surge 18'+ above normal

The normal forecast terminology that is used will be:

**Tropical Storm** winds > 39mph, and winds < 73 mph

**Tropical Storm / Hurricane Watch** – Storm conditions are possible within 48 hours

**Tropical Storm / Hurricane Warning** – Storm conditions are expected within 36 hours

Because the GH flight duration can be as long as 30 hours, HS3 participants staying at nearby hotels should pay careful attention to a storm's progress. It might be wise to pack belongings or to fully check out of the hotel prior to the tropical storm / hurricane watch announcement. HS3 staff could have instrument responsibility in the Payload Operations Room (POR) on a day when a storm is distant but approaching. A storm can progress and intensify during the span of one flight duration. Coastal hotels may not wait until after a flight returns for staff to retrieve belongings, and inland hotels will be filling fast. If the storm is projected to be a Cat 3 or larger, everyone other than the HS3 mission critical personnel will be asked to leave.

### 3. General Evacuation Information:

A hurricane warning for a Cat 3 storm or above is equivalent to an evacuation order. When such an evacuation order is issued, it must be taken very seriously; staff should implement departure plans without hesitation. Decision-making criteria for an evacuation include size of storm, anticipated path of storm, anticipated storm surge, number of citizens affected and mobilization times. Many coastal residents trying to evacuate have spent several hours on congested highways or searching for available shelters. Evacuations can be unpredictable. It is generally true that large or strong storms are more likely to prolong travel time.

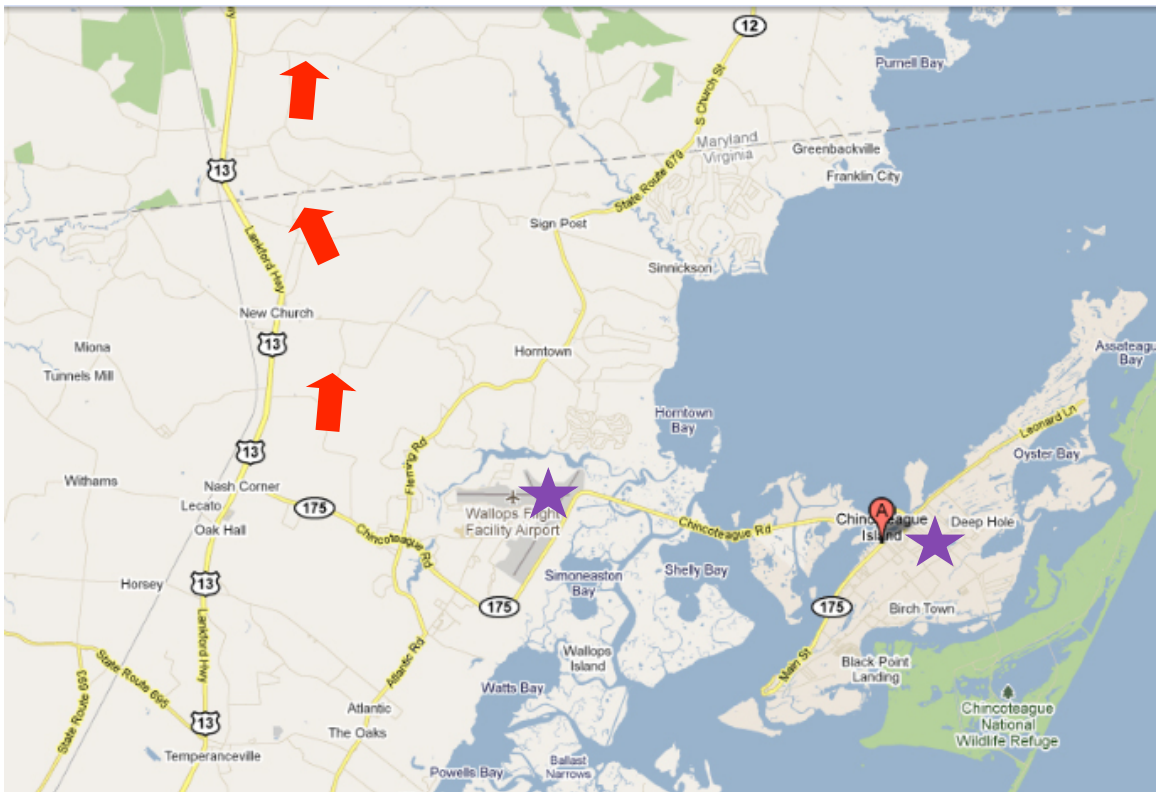
It is very important that staff review their particular evacuation route prior to an actual evacuation order. It is recommended that staff adhere to these routes no matter how bad the traffic. Highway on and off ramps can be closed, as patrols may reverse lanes on all incoming traffic to accommodate the massive exodus. Other smaller roads may already be experiencing flooding or have unadvertised construction that will hinder travel. Be sure to fill cars with gas in advance.

Establishing the Wallops Main Base as the HS3 deployment site meant accepting the risk of hurricane evacuations. WFF is one of many coastal localities in Virginia for which hurricanes and significant Nor'easters may present a major hazard. If a hurricane occurs in eastern Virginia, the coastal areas of Accomack County, including the roads providing access to the WFF Main Base, are likely to be affected by storm surge flooding, especially where they cross tidal streams. The Wallops Main Base has elevations of 34-ft and higher for most areas, so flooding on base is not expected to be a problem during severe storms, but high winds and loss of commercial power can be expected. For those reasons, all of NASA Wallops is typically closed under an emergency order to all employees and visitors during major storms, except for a core group of personnel in security, the fire department, and staffing the Wallops Emergency Operations Center. Once Wallops is closed, there will not be any food service available on base.

If a severe hurricane made landfall in Accomack County, the storm surge at NASA's Wallops Island (the barrier island located 8 miles to the SE of the Wallops Main Base) could reach almost 20 feet above sea level. The entire Wallops Island could experience major damage, including the multiple launch pads and buildings located there. All Wallops Island personnel will be evacuated if a major hurricane threatens the area. Keep in mind there are few roads into and out of small coastal/island communities like Accomack County. Storms change course, and if you become trapped in traffic slowly heading inland towards Annapolis or Wilmington, you may still remain in the storm's path. Bottom line: if you are leaving, you need to leave early!

The causeway road linking Chincoteague Island to the mainland is subject to severe flooding and total closure for multiple hours during significant storm events. The entire population of Chincoteague is often evacuated by emergency orders when a major storm approaches the area. The Town of Chincoteague has an Emergency Operations Plan. The purpose of the town plan is to establish the legal and organizational basis for operations in the Town of Chincoteague in response to any type of disaster or large-scale emergency. The Town of Chincoteague's primary Emergency Operations Center (EOC) is located in the Municipal Building at 6150 Community Drive. The Town's communication center and 24 hour warning is located in the Town Police Department. The police department's primary telephone line is (757) 336-3155. During emergency operations, (757) 336-0911 may also be used. AS ALWAYS IN AN EMERGENCY - 911 MAY BE USED.

**The base evacuation plan for HS3 is to travel north on Hwy 13.** Each HS3 team should work out a more specific evacuation plan in advance to include which team members leave earlier, which team members stay until mandatory evacuation, and exactly where each team member will go. Flights out of Salisbury and Baltimore will fill fast so reservations should be made during HS3 Level Blue (72 hrs prior to landfall).



**Residents of Northampton and Accomack Counties will use Route 13 North as the evacuation route. The Chesapeake Bay Bridge Tunnel (CBBT) is not an evacuation route since the CBBT typically is closed to all traffic during major storms.**

In choosing your destination, keep in mind that the hotels and other sheltering options in most inland metropolitan areas are likely to be filled very quickly in a hurricane evacuation event. Evacuation shelters are located throughout the state; however these can fill fast also. Not all shelters open as planned and additional shelters may open as needed. Local media will announce shelters or you may call the local Red Cross Salisbury office (410) 749-5331 for additional information. Shelters are exactly that, just a shelter; the only amenities you will have are those you bring. For that reason, the following list may assist in your planning for an evacuation.

#### **Supply Items:**

- Supply of Water (One gallon per person per day)
- Supply of Non-Perishable or canned food
- Utensils (Can Opener, disposable plates, cups, forks, knives)
- Change of clothing (including rain gear)
- Hygiene items (soap, toothbrush, wash cloth, towel, toilet paper)
- Blankets or sleeping bags
- First aid kit (including prescription drugs / aspirin)
- Battery powered radio, flashlight, batteries
- Credit cards and cash
- Plastic garbage bags
- Books, cards, games

#### **4. HS3 Evacuation details:**

Many of the actions that will take place before and after the HS3 evacuation will be decisions made in real-time. However, when WFF gives HS3 notice to evacuate it will be necessary to evacuate the aircraft and all personnel very efficiently. The Global Hawk takeoff time will be set based on storm

progression and safety and not based on mission objectives. Staff will evacuate to higher ground (inland). Once a hurricane watch is called, all persons still on site will be encouraged to have bags packed and to be ready for immediate movement. Depending on circumstances (time of day, severity of evacuation, etc), there may not be ample notice for staff to return to the lab. ESPO will interface with local WFF management and emergency operations personnel and will contact each team lead with emergency guidance, and if that person cannot be reached or cannot reach all of his/her team, someone could be left behind. We want to avoid this with careful planning. This is why ESPO collects local contact info and it is critical to keep it up to date.

The WFF Hurricane Plan requires aircraft evacuation at 24 hours prior to storm arrival (Condition II). If the Global Hawk is required to evacuate, it will be flown to Armstrong. The decision of when or if the aircraft and teams might return to WFF will depend on the size of the storm, time remaining in the campaign, and severity of damage to the area after a landfall, among other criteria.

At the beginning of this evacuation plan is a suggested timeline to follow. Actions are listed in order of conditions of readiness for step-by-step planning.

### **5. Please Stay Safe!**

Your safety is paramount. Our purpose is to better understand these storms but not risk anyone's life in the process. All individuals should have their own plan including coordination with others on the HS3 team. We will be well aware of the hurricane's existence, size, and location and should have no excuses for not having a well executed plan. Please use the time wisely!

### **6. For Emergency Purposes Only:**

Below is a link to a list of local evacuation centers and radio stations expected to broadcast emergency information. The site also includes guidelines on what to bring and what not to bring to a shelter.

<http://co.accomack.va.us/departments/emergency-management/county-government/emergency-shelters>

### **7. Other Useful Links:**

FEMA Hurricane Hazards Fact Sheet  
<http://www.ready.gov/hurricanes>

FEMA Social Media Tools  
[http://www.fema.gov/pdf/hazard/hurricane/2010/hurricane\\_week\\_social\\_media.pdf](http://www.fema.gov/pdf/hazard/hurricane/2010/hurricane_week_social_media.pdf)

Virginia Department of Emergency Management Hurricane Guide  
[http://www.vaemergency.gov/sites/default/files/2011\\_Virginia\\_Hurricane\\_Guide.pdf](http://www.vaemergency.gov/sites/default/files/2011_Virginia_Hurricane_Guide.pdf)

Chincoteague Hurricane Information  
<http://www.chincoteague-va.gov/citizens/severe-weather>

Accomack County Evacuation Plan  
<http://co.accomack.va.us/departments/emergency-management/county-government/evacuation-plan>