



## HABEX/CWE 2015:

### TRANSPORT CANADA/ NAVCANADA OPERATIONAL PROCEDURES AND GUIDELINES

Coordination with airspace authorities is paramount for a safe balloon launch. In Canada, our airspace is governed by Transport Canada and NavCanada. TC expects to see a plan as well as much information as possible on your payload and balloon set-up. Communications with airspace authorities should be handled by your team leader. Your team leader must be reachable by phone and email at all times, especially during the launch.

Balloon launches are subject to approval from TC. If your balloon has more than 115 cubic feet of helium, then you'll need approval from TC headquarters in Ottawa. Since the HABEX kit will not exceed this amount (typically 80 cubic feet), you'll only need to be in touch with a regional airspace specialist.

An essential part of filing with NavCanada is the Notice-to-Airmen (NOTAM). This is sent on your behalf by your local Flight Information Center (FIC). This notice is made known to all pilots flying in the area to be on the lookout for your balloon and payload. For your convenience, we have provided a worksheet that you can fill out and send to the FIC as well as your local regional airspace specialist to help them issue an effective NOTAM.

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First things first, you'll need to run a prediction using the CUSF Landing Predictor (<http://predict.habhub.org/>). This prediction will give you most of the necessary details for filing your NOTAM:

1. Find the latitude/longitude of your launch site
  - a. you can find this on most mapping software such as Google Earth/Maps
  - b. Enter these values into the lower-left field in the predictor.
2. Enter the launch Altitude
  - a. This is the elevation of your launch site compared to sea level. For example, the city of Regina is approximately 571 meters above sea level and this value would be entered in the "Launch Altitude" field.
3. Enter the time and date of launch
  - a. If the planned date of launch is too far out of range, the predictor will not run the simulation. Use times and dates that are closer to your current time to get an estimate of the flight path.

- b. Be sure to run the prediction regularly leading up to your launch date. Use different times and dates to get a good idea of where your balloon kit will burst and land.
4. Click on “Use Burst Calculator” to calculate the values for the ascent rate and burst altitude
  - a. Enter your payload mass (the mass of your kit, usually: 1000g)
  - b. Enter the balloon mass. Select Kaymont - 600.
  - c. Enter the Target Burst Altitude. Whilst this largely depends on how much helium you use, we recommend using 30000m.
  - d. Select “Use Values”
5. Enter 5m/s for the “Descent Rate” field.
6. Click “Run Prediction”
7. Save the prediction as a screenshot.
  - a. We recommend going in full screen mode
  - b. If using a mac, use COMMAND + SHIFT + 4
    - i. Your cursor will turn into crosshairs and you can now select the area you’d like captured. Be sure to include the details in the upper left corner of the predictor.
  - c. If using a windows, hit the Print Screen button (sometimes abbreviated as PrtScn). Open up Microsoft Paint, and enter CTRL + V to paste the capture on the canvas.

Once you have the prediction ready, you are now ready to fill out the information on the worksheet.

1. **Launch time:** This is the time you plan to release the balloon. Include local time as well as the corresponding time in the GMT time zone (use this tool: <http://www.greenwichmeantime.com/>). Be sure to include the time in a 24 hour format (ex: 2:00pm should be 1400)
2. **Launch Site Location:** This is where you input the geographic coordinates (latitude and longitude) you will be launching from. This should be ready to paste from the prediction. Please note that the coordinates must be given in a degrees-minutes-seconds format. This can be given by a simple Google search, but here is how to convert decimal coordinates to **D-M-S** mathematically:
 

60 seconds = 1 minute and 60 minutes = 1 degree

For example, take a latitude of **50.412454**. This would be converted to **D-M-S** by the following steps:

  1. Subtract the **degrees** then multiply by 60 =  $0.412454 \times 60 = 24.74724$  minutes
  2. Subtract the **minutes** then multiply by 60 =  $0.74724 \times 60 = 44.8$  seconds
  3. Rounding the answer is **50° 24’ 45”** North latitude.
3. **Ascent Rate:** How fast your balloon will reach burst height given in feet/minute. This is obtained from your prediction. typical values range from 900 to 1200 feet per minute.
4. **Predicted Track:** This is the direction and distance of the landing site with respect to your launch site. This is given in nautical miles (for ex: SOUTH for 25 NM). (Note: 1 Kilometer = 0.539957 Nautical Miles)

5. **Burst Height:** This is given in feet above sea level. We are predicting most balloons to have a burst height of around 92000 feet, which is around 28km. Some will burst higher, some lower, but this is a good estimate
  6. **Descent rate:** Given in feet per minute. this will depend on your payload weight. Typical values range from 1000 to 1500 feet per minute.
  7. **Other Information:** Here you will include some key details:
    - a. [TEAM LEADER NAME] will contact the [LOCAL ACC] Shift Manager at [ACC NUMBER] thirty minutes prior to launch to confirm the intention to launch and again just prior to launch to request permission to launch.
    - b. The [LOCAL ACC] Shift Manager will advise [LOCAL AIRPORT] Tower when the balloon has launched.
    - c. The balloon is expected to take just over [X] hours to reach burst height and will descend for approximately [X] minutes.
    - d. The balloon will be white latex, approx. 7.5 feet in diameter at launch, have a gas capacity of 73.5 cubic feet of helium and increasing in size as it ascends. Twenty feet below the balloon will be an orange parachute. Thirty-two feet below the balloon will be one small box about 12” in size and white in colour. [Adjust details of balloon/payload as necessary]
    - e. The balloon will not be transponder equipped but will carry one GPS trackers. The trackers can be monitored through the following website which is updated every 2.5 minutes: [SPOT GPS SHARED LOCATION URL]
  8. **Contact Information:** This is the full name, cell phone number and email of your team leader. It is essential to provide up to date information, as the team leader must be reachable at all times, especially just prior to and just after launch.
  9. **Associated NOTAM:** This is the actual notice that is sent out to the airspace. It is made up of the elements from the worksheet above. Your FIC will likely take care of this, however here is an example for your information:
    - a. XXXXXX CZWG WINNIPEG FIR  
  
CYQR MEDIUM BALLOON LAUNCH 50<sup>0</sup>25'52" -104<sup>0</sup>32'10" W  
  
BALLOON PAYLOAD SYSTEM LEN 40 FT ON ASCENT. PAYLOAD WEIGHT 1.1 lbs.  
  
RATE OF ASCENT 1150 ft, BURST HEIGHT APRX 92,000' MSL.  
  
ESTIMATE LDG WITHIN OF 25.7 NM SOUTH LAUNCH SITE.  
  
1504091400 TIL 1504091700
  10. **Prediction Screenshot:** Include the screenshot you obtained when you ran the prediction for your flight.
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Once you have this information, you must contact your local Regional Airspace specialist. For your convenience, all key contact information is included in this document below. Inform them of your intent to launch a high altitude balloon and be prepared to answer questions they may have for you regarding your launch. Be sure to send the worksheet as well as any requested supplemental materials as promptly and detailed as possible. The airspace specialist will then approve your launch and inform you of the local procedures that will take place prior, during, and after launch.

### **KEY CONTACT INFORMATION**

*For teams in Regina, Calgary, Winnipeg and Inuvik:*

**Regional Airspace Specialist (Transport Canada: Prairie and Northern Region):**

Bruce McMillan: (204)983-5290 : [bruce.mcmillan@tc.gc.ca](mailto:bruce.mcmillan@tc.gc.ca)

**Flight Information Center:** 1(866)-WXBRIEF [1(866)992-7433]

**Area Control Centers:**

Regina, Winnipeg: (204) 983-8337 (WINNIPEG ACC)

Calgary, Inuvik: (780) 890-8304 (EDMONTON ACC)

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*For teams in Oshawa and Markham:*

**Regional Airspace Specialist (Transport Canada: Ontario Region):**

Laird Gillespie: (416) 952-0242 : [laird.gillespie@tc.gc.ca](mailto:laird.gillespie@tc.gc.ca)

**Flight Information Center:** 1(866)-WXBRIEF [1(866)992-7433]

**Area Control Centers:**

Oshawa, Markham: (905) 676-4590 (TORONTO ACC)

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*For teams in Langley:*

**Regional Airspace Specialist (Transport Canada: Ontario Region):**

Peter Cox: (604) 504-4661: [peter.cox@tc.gc.ca](mailto:peter.cox@tc.gc.ca)

**Flight Information Center:** 1 (866)-WXBRIEF [1 (866) 992-7433]

**Area Control Centers:**

Langley: (604) 586-4590 (VANCOUVER ACC)

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**TC/NAVCAN NOTAM WORKSHEET (Available on Dropbox via: <https://www.dropbox.com/s/1a71f572zhp2x5/BALLOON%20LAUNCH%289APR15%29.docx?dl=0> )**