GPS For Tracking:

Most civilian GPS receivers will stop working at an altitude of roughly 18,000 m ~ 60,000 ft. This prevents most trackers from being able to update your payload's position above 18,000 m. Sometimes it is possible to obtain specialized GPS receivers (more expensive) that work above 18,000 m.

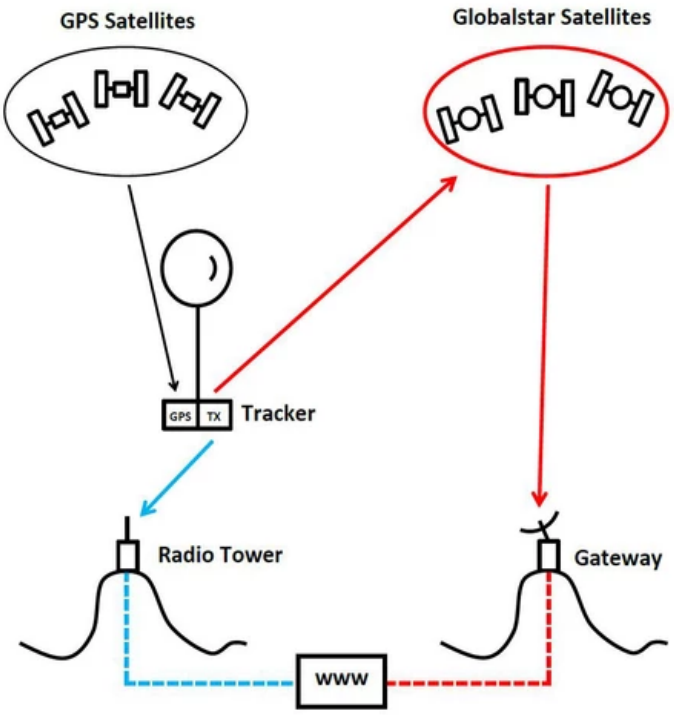
How a Tracking System Works.

In order to have a tracking system, you need **a tracker**, **a network**, and **an internet connection**.

A tracker is simply a GPS receiver and a radio transmitter built into a single piece of hardware. The tracker is able to determine its precise location by receiving position signals from GPS satellites with its GPS receiver. The tracker then uses its built-in radio transmitter to transmit its position to a network. The network can be either ground or satellite-based.
Examples of ground-based networks include cellphone towers and amateur radio APRS stations.
Examples of satellite-based networks include Globalstar and Iridium satellites relaying your tracker's signal down to a gateway on earth.

Both types of networks are connected to the world wide web. As long as you have access to the internet (by computer, smartphone, etc.) and everything is working as it should, you will be able to track your weather balloon payload.

The weakest link in any tracking system is always between the tracker and the network. If a cellphone tracker lands in a rural area without network coverage, you'll lose your payload. If a satellite tracker's antenna is not pointed at the sky, the satellites in orbit will never receive the tracker's transmitted signal and you'll lose your payload.



There are three typical methods that are used for this:

1) amateur radio system
2) GPS messaging systems
3) cellular data systems

Amateur Radio Tracking

Using amateur radio (ham radio) signals to track your high altitude balloon flight is by far the best option and we strongly recommend utilizing this method. Not only is it the most reliable method, but it is also very rewarding to develop and/or configure a computer tracking system yourself! Using a radio tracking method will allow you to receive positioning reports throughout the entire flight in roughly one-minute increments. This allows you to follow the entire flight all the way up to burst altitude and even predict the landing location in realtime while the weather balloon payload is still in the air! In the United States (and many other countries), you'll need to obtain an amateur radio license first, which is not that hard to get. You'll need to do some minimal studying and take an amateur radio test to obtain a license.

GPS Messaging Systems

Using a GPS Messaging System to track your high altitude balloon flight is the second-best method available. These systems are fast and easy to get up and running and don't require a license to use, however, they are usually much more expensive and require an annual subscription to use the GPS Messaging service. The most popular GPS Messaging System used for weather balloon flights is the **Spot 3 Satellite Messenger**. This system will work anywhere in the world and just needs a clear view of the sky, but there are some downsides and things to consider. First, the system will only operate to approximately 60,000 ft (18,300 m) in altitude. These systems aren't designed to be airborne so the system will lose it's GPS fix above the maximum altitude, however, it should regain a GPS fix during descent. This limitation means that you won't be able to obtain a definitive maximum altitude reading unless you have some other onboard system recording altitude. Secondly, the GPS System requires a clear view of the sky and should be pointed upwards for the best signal. Payloads have been lost simply by landing upside down or on it's side causing the GPS System to lose signal.

Cellular Data Systems

These systems are the worst and we strongly recommend avoiding them in most circumstances. If you must use one, it should be only as a backup method and you'll need to take special care to comply with the government rules and regulation.

Simulation Softwares and services:

1) http://astra-planner.soton.ac.uk/

Astra simulates the flight of a latex gas balloon in Earth's atmosphere.

The underlying mathematical model (described in detail in the paper linked below) is approximated numerically using the Livermore Solver for Ordinary Differential Equations (LSODE).
The atmospheric conditions are based on the forecast obtained from the US National Oceanic and Atmospheric Administration.

There are a number of sources of uncertainty, which affect the results of the simulation - a Monte-Carlo procedure is used to provide an indication of the associated error margins.

Terms & Conditions
This service is offered in the hope that it will be useful, but WITHOUT ANY WARRANTY;

without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

PROS: Free to use.
Easy to use
Trusted and reliable results

CONS: Uses fixed standards of Loads, balloons and parachutes.
Hence requiring choosing the closest options based on our model.

2) https://predict.habhub.org/
CUSF Landing Predictor 2.5

Cambridge University Spaceflight Landing Predictor (github)

A tool to predict the flight path and landing location of latex sounding balloons.
Written by Jon Sowman, Adam Greig and Daniel Richman for CUSF. Credit also to Rich Wareham for work on the predictor. Some parts of code taken from old landing prediction software, credit to Rob Anderson, Fergus Noble and Ed Moore.
This predictor uses data from the NOAA GFS models.
About
Written by Adam Greig for CUSF in March 2010. Maths derived from `burst1a` spreadsheet by Steve Randall. Balloon information from Kaymont Totex sounding balloon data.

PROS:

Easy to use
Free to use
Minimal Parameters
Reliable results

CONS:

None so far.

3) **University of Wyoming's "Balloon Track" program**

http://weather.uwyo.edu/upperair/balloon_traj.html

Cons:

Less reliable and a very rudimentary design.

There are several other Downloadable software but they essentially use similar algorithms and/or are very old and outdated hence have no GUI and require Qbasic or such compilers and CLI.

References:

https://www.overlookhorizon.com/how-to-launch-weather-balloons/tracking-systems/

https://www.highaltitudescience.com/pages/tracking-a-weather-balloon

And other Links mentioned in the text.