Online Ballooning Portal

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What is the portal?

An all inclusive online ballooning toolkit:

- Planning
- Prediction
- Tracking
- Analysis
- Sharing

Why are we doing this?

- 2012 AHAC identified a desire to easily share data
- Beginners frequently launch without a prediction due to perceived difficulty
- Shared data can fill gaps and provide examples
- “Big data” enables statistical modelling

Objectives

- Simple interface to detailed prediction engine
- Plug and play tracking system
- Seamless telemetry storage
- Easy data sharing
- Straightforward data presentation
- **Open source and community driven**

Prior work

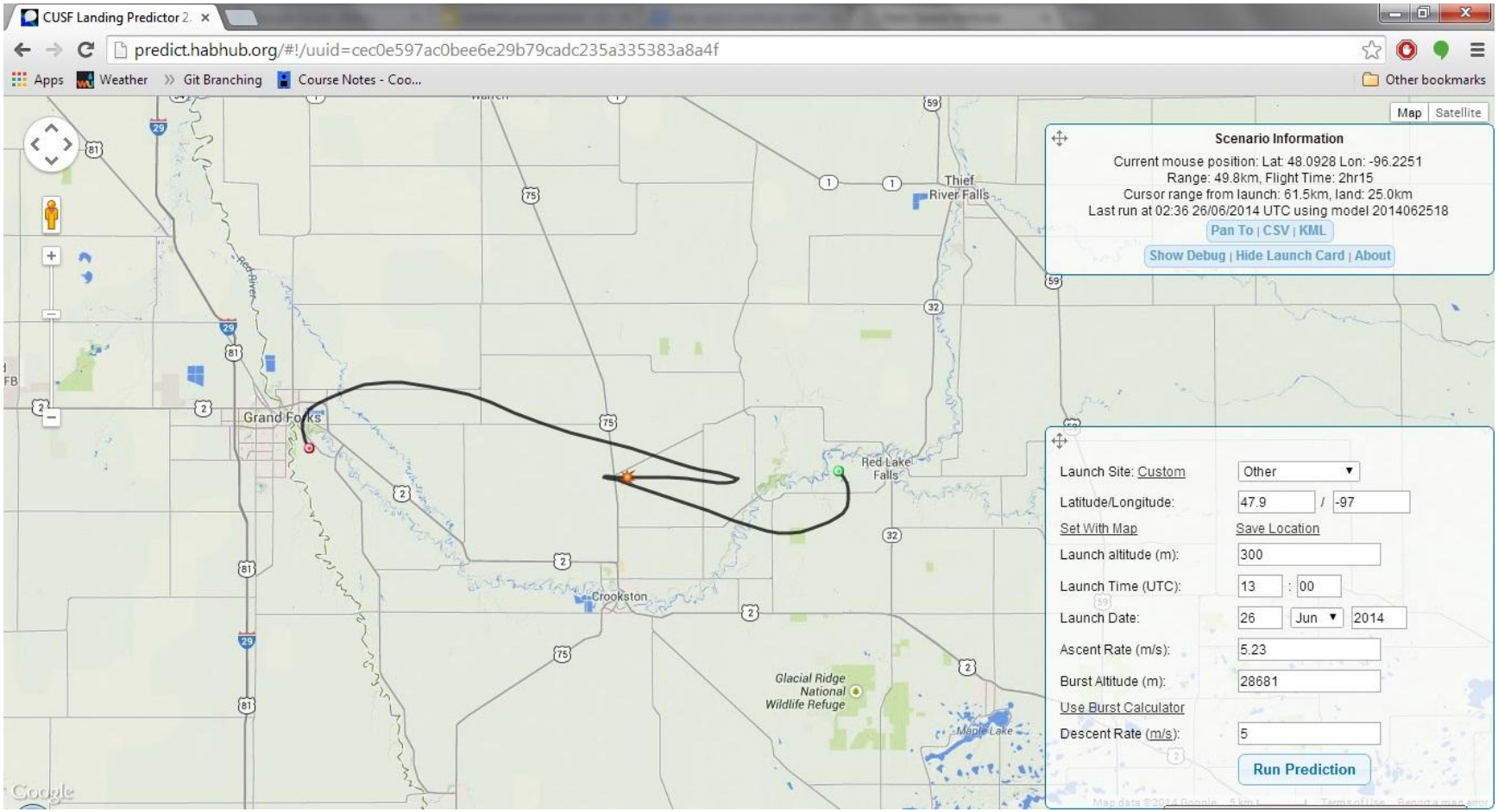
Prediction

- Near Space Ventures
- HabHub - UKHAS
- ASTRA - University of Southampton

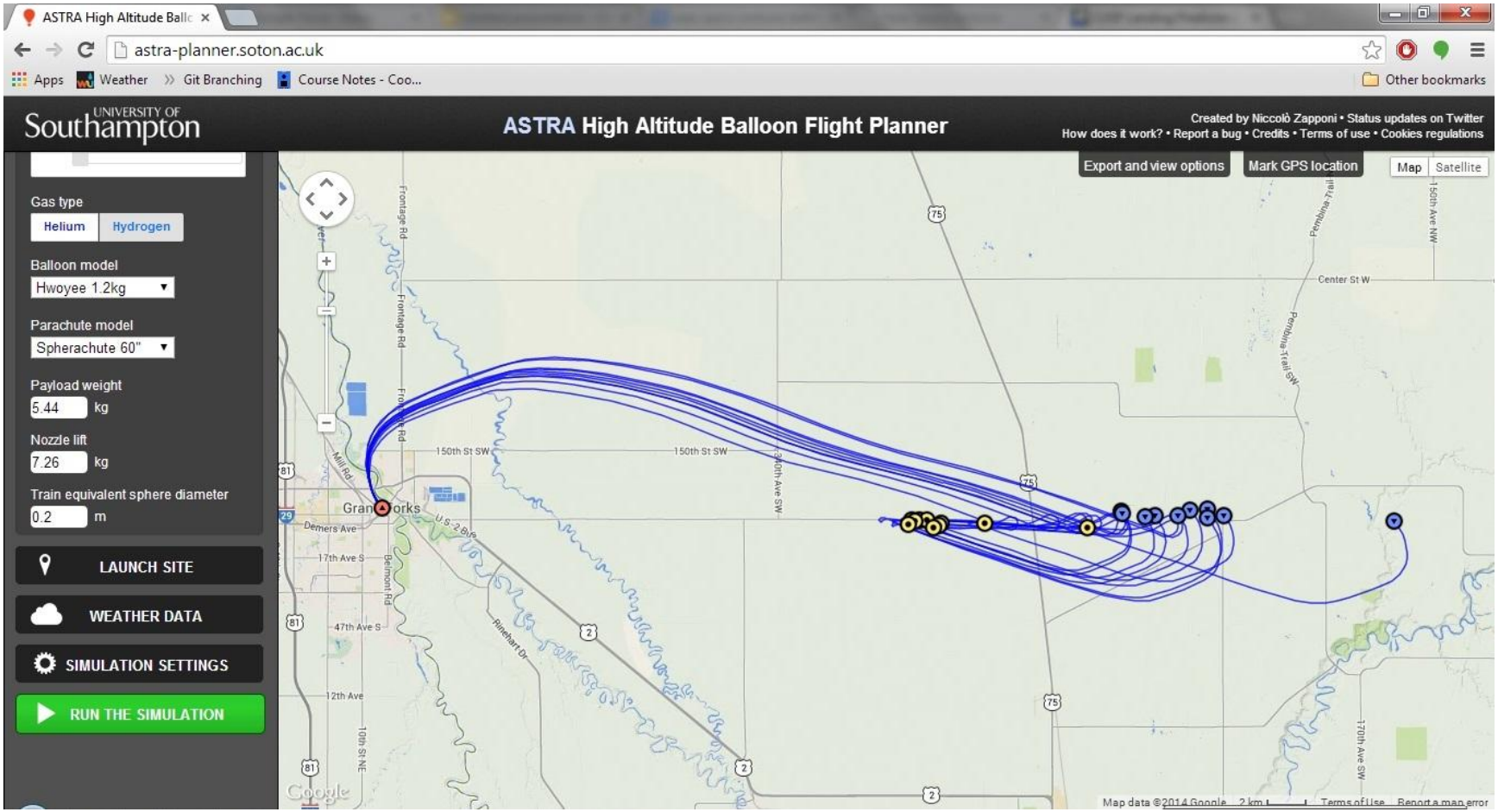
Tracking

- aprs.fi, openaprs.net, etc…
- Spacenear - UKHAS

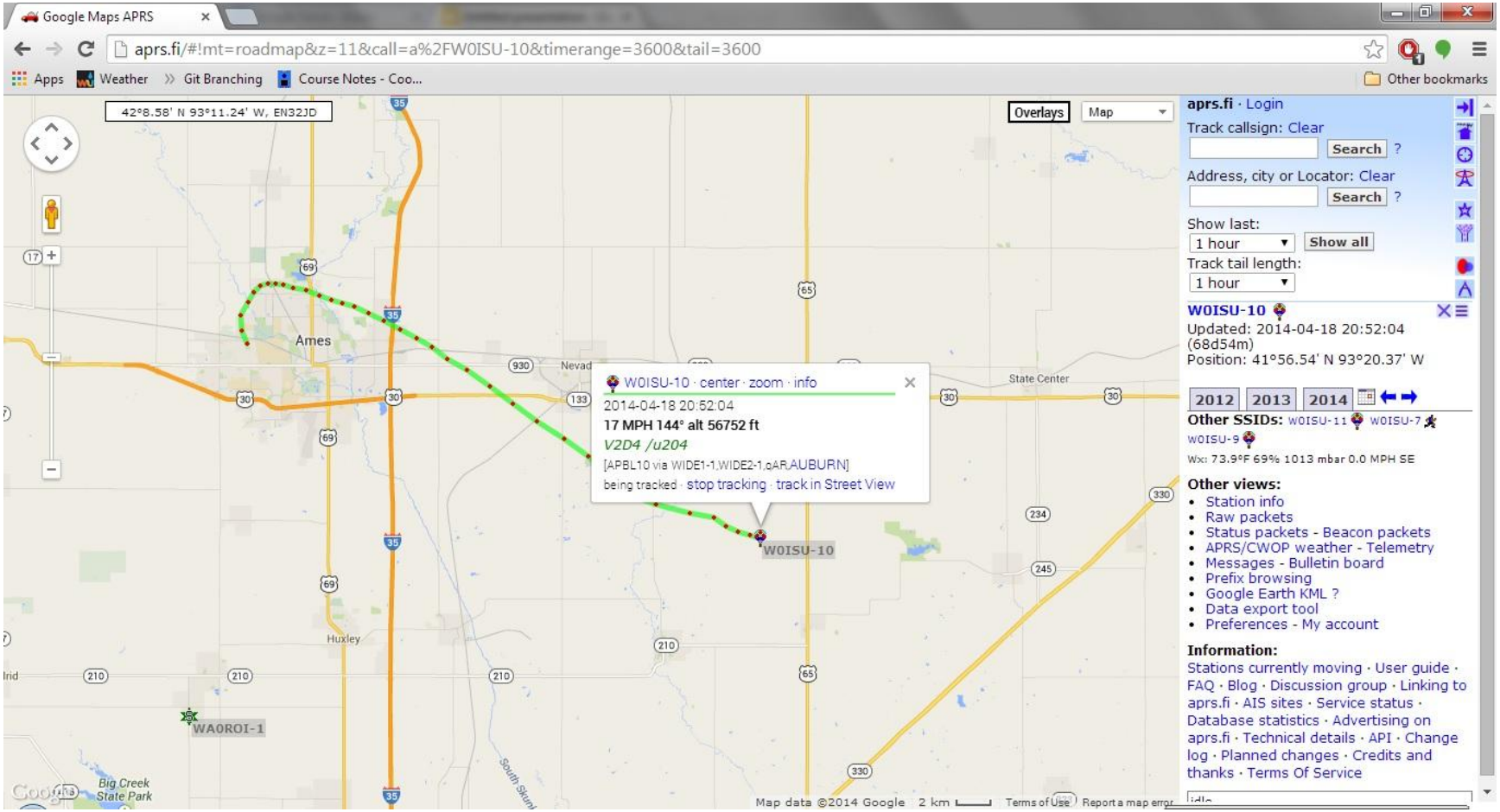
HabHub Predictor



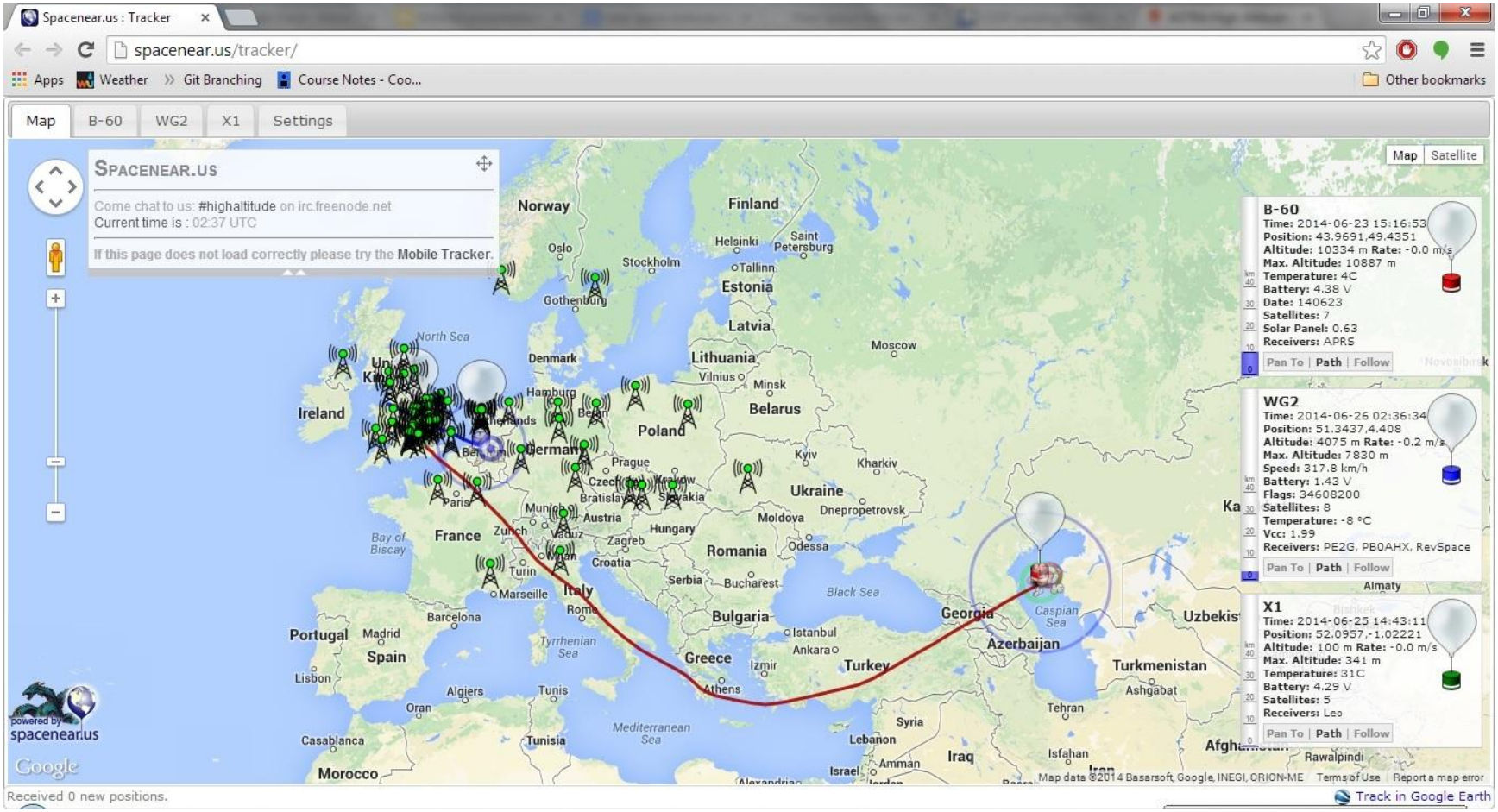
ASTRA Predictor



APRS.fi Tracker



Spacenear Tracker



No good solution so far

- No telemetry storage
- No data analysis
- No seamless sharing
- No start to finish solution

Proposed solution

Create a flight

- Parameter entry
- Rough predictions
- Tracking/telemetry definition
- Schedule flight
- Paperwork generated
- Announcement issued
- Flight page posted on website

Proposed solution

Tracking

- Confirm launch parameters
- Telemetry stations upload data
- Track and predictions updated live
- Paperwork generated
- Graph live telemetry
- Update status on website

Proposed solution

Analysis

- Export data
- Plot data
- Generate reports
- Analyze prediction accuracy
- All data attached to flight page

Proposed solution

Sharing data

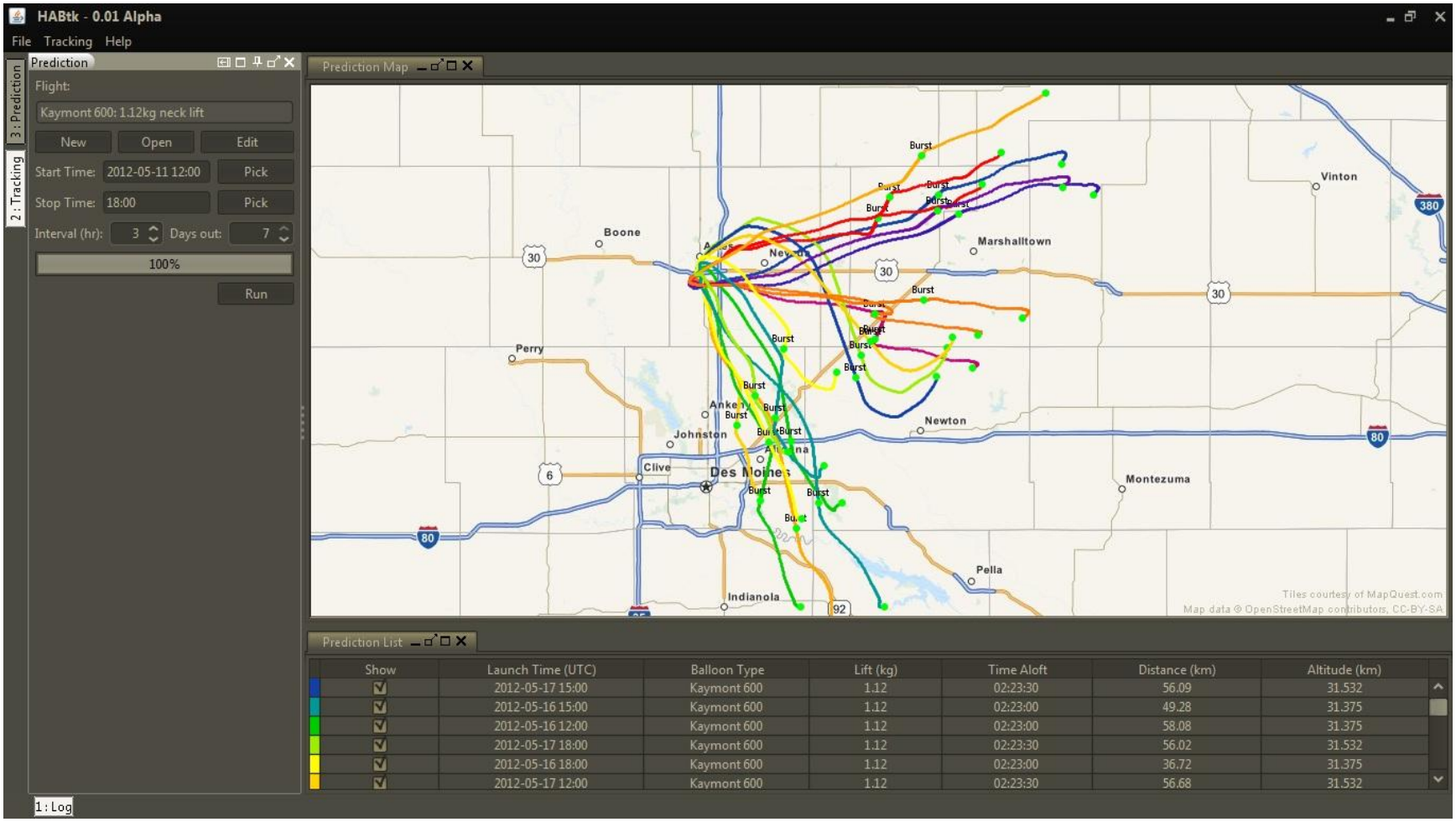
- Browse prior flights
- Search for flights using mission parameters
- Search for data using attributes and tags

Current work

HABtk

- Bulk predictions
- Tracking/logging
- Telemetry upload
- Real-time predictions

HABtk



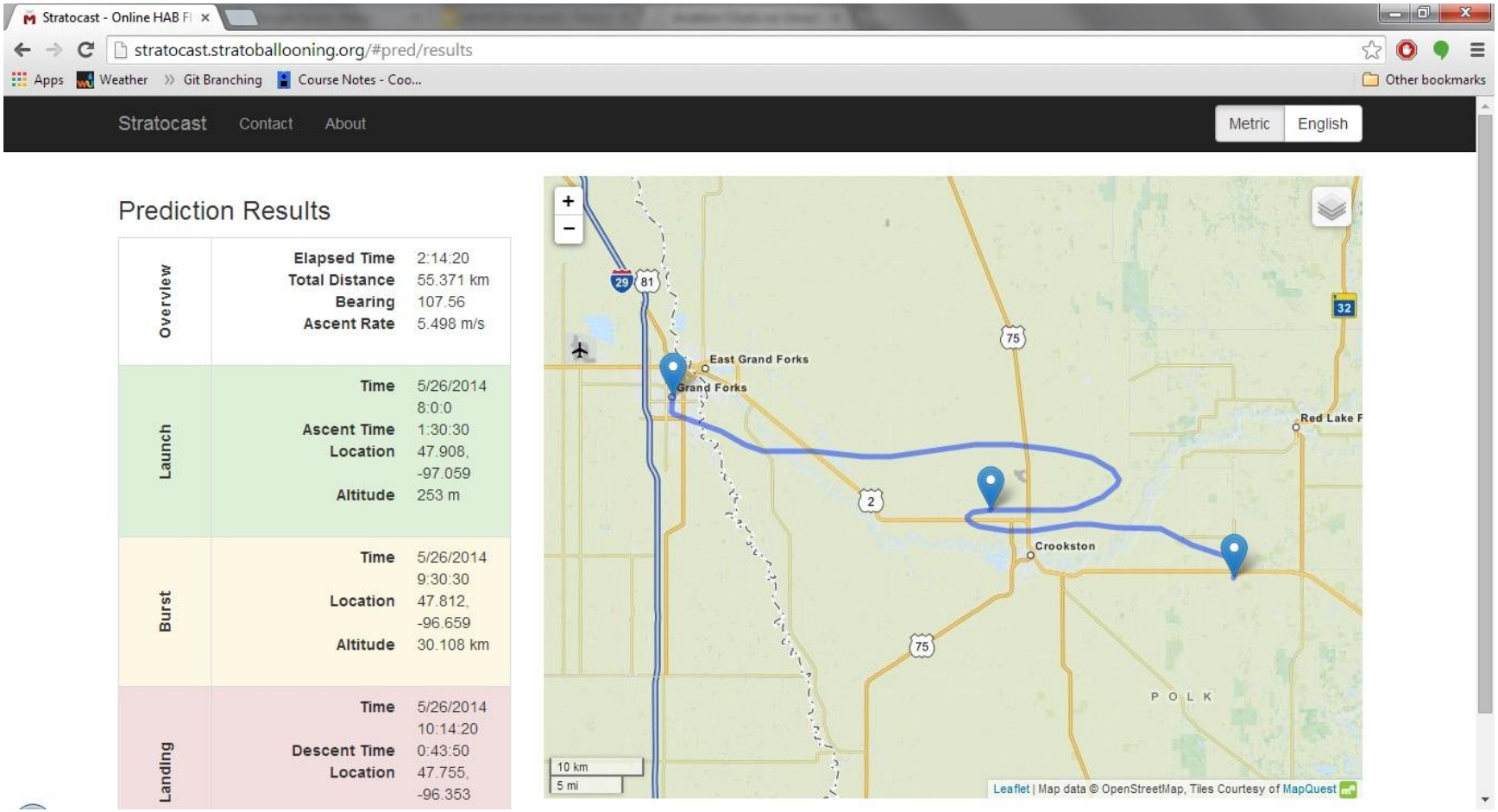
Show	Launch Time (UTC)	Balloon Type	Lift (kg)	Time Aloft	Distance (km)	Altitude (km)
☑	2012-05-17 15:00	Kaymont 600	1.12	02:23:30	56.09	31.532
☑	2012-05-16 15:00	Kaymont 600	1.12	02:23:00	49.28	31.375
☑	2012-05-16 12:00	Kaymont 600	1.12	02:23:00	58.08	31.375
☑	2012-05-17 18:00	Kaymont 600	1.12	02:23:30	56.02	31.532
☑	2012-05-16 18:00	Kaymont 600	1.12	02:23:00	36.72	31.375
☑	2012-05-17 12:00	Kaymont 600	1.12	02:23:30	56.68	31.532

Current work

Stratocast

- Guided predictions
- Simplified quick predictions
- Reverse predictions
- Balloon burst calculator
- Simplified interface
- Mobile/tablet compatible

Stratocast


Stratocast - Online HAB Fl
stratocast.stratoballooning.org/#pred/results
Apps
Weather
Git Branching
Course Notes - Coo...
Other bookmarks
Stratocast
Contact
About
Metric
English
Prediction Results
Overview
Elapsed Time 2:14:20
Total Distance 55.371 km
Bearing 107.56
Ascent Rate 5.498 m/s
Launch
Time 5/26/2014 8:0:0
Ascent Time 1:30:30
Location 47.908, -97.059
Altitude 253 m
Burst
Time 5/26/2014 9:30:30
Location 47.812, -96.659
Altitude 30.108 km
Landing
Time 5/26/2014 10:14:20
Descent Time 0:43:50
Location 47.755, -96.353
East Grand Forks
Grand Forks
Crookston
Red Lake F
POLK
29
81
75
2
32
10 km
5 mi
Leaflet | Map data © OpenStreetMap, Tiles Courtesy of MapQuest

Current work

Platform planning

- Requirements definition
- Standards development
- Database development
- Website integration

Current work

Standards development

- Interoperability
- Data description
- Telemetry/telecommand description

Current work

Predictor development

- Atmospheric data interpolator
- Float predictor
- Zero-pressure predictor
- Wind extraction and assimilation

Future work

- Statistical modelling
- Automatic performance evaluation
- Distributed tracking network
- Universal SDR transceiver

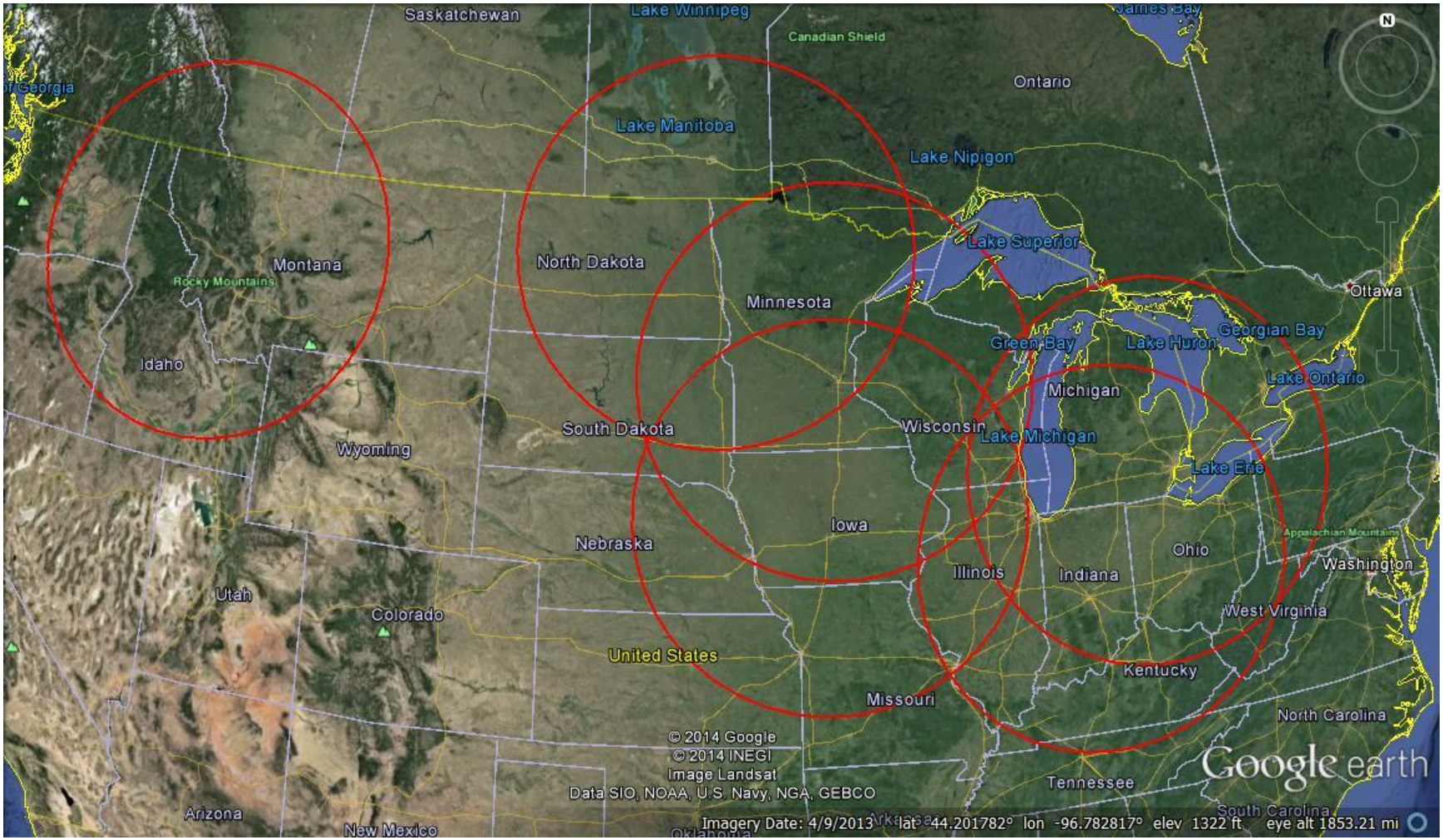
Modelling & evaluation

Modelling is difficult:

- Drag crisis
- Thermal effects
- Different manufacturers

Machine learning can help identify statistical models and continuously evaluate model performance.

Distributed tracking



Get involved

- Feature requests
- Planning
- Programming
- User experience design
- Testing
- Flight data

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