Chemical Inventory

Daniel Brothers

What Types of Chemicals are used on the NDCMP

- Silver Iodide (AgI)
- Ammonium Iodide (NH_4I)
- Sodium Perchlorate ($NaClO_4$)
- Paradichlorobenzene (Moth Crystals)
  - 1 Can = 20 Units
- Raw Acetone
- 20 g Ejectable Flares (EJC)
- 75 g Burn-in-Place Flares (BIP)
- Distilled Dihydrogen Monoxide

Flares & Chemical Inventory

- Losses such as spills or dud flares
  - How many times do you try a flare before it is considered a dud?
    - TWO
  - What do you do with duds? Throw them away?
    - No!!! Set them aside for pick up by ARB staff.
  - How about burned BIPs?
    - Throw them out.
  - And what about ejectable casings?
    - Save them for ARB staff to pick up.
  - How do you report lost/spilled chem?
    - Call Dan and confess.

Chemical Inventory

- Initial Chemical Inventory should be completed BEFORE filling burners.
- Inventory DOES NOT include mixed chemical or flares on the airplane.
- The PIC(s) will be held responsible for inventory.
- When do we send in weekly inventory?
  - Every Monday BEFORE BRIEFING (17:00 Z)!
- Write down Chem Transactions on legal pad provided and leave in chem shed.

Questions?

Pilot Aircraft Recordkeeping System (PARS)

Daniel Brothers

General Information

- Paperwork is required by law.
- From June 1 through the end of project a flight form and map are required for every flight the plane makes.
- Keep it professional. All records are open to the public.
- If/when PARS doesn't work, paper flight forms and maps will be expected, so be prepared. It will happen to someone over the course of the summer.
  - Paper forms are provided in the packets given to pilots when they pick up their iPads.

Paperwork

- Mission Summary
  - Required for every flight
  - Should be a synopsis of the mission. What happened. What was seen.
  - If “Other” than what was the reason for the flight?
    - Most commonly a reposition flight
  - What kind of “Maintenance”? Burner check or something else?
  - If “Recon” than why no seeding?
  - Common Abbreviations are ok, but avoid less common ones.
    - BIS for Bismarck is fine, 08D for Stanley is not.

Paperwork

- There are 5 possible purposes on project
- Recon – An operational mission where no seeding occurred.
- Rain – Rain enhancement, typically characterized by only using one burner and no BIPs.
- Hail – Hail suppression, typically uses two burners and possibly BIPs.
- Other – Miscellaneous ARB flights, usually reposition flights after missions.
- Maintenance – WMI flights, usually burner checks and test flights after repairs.

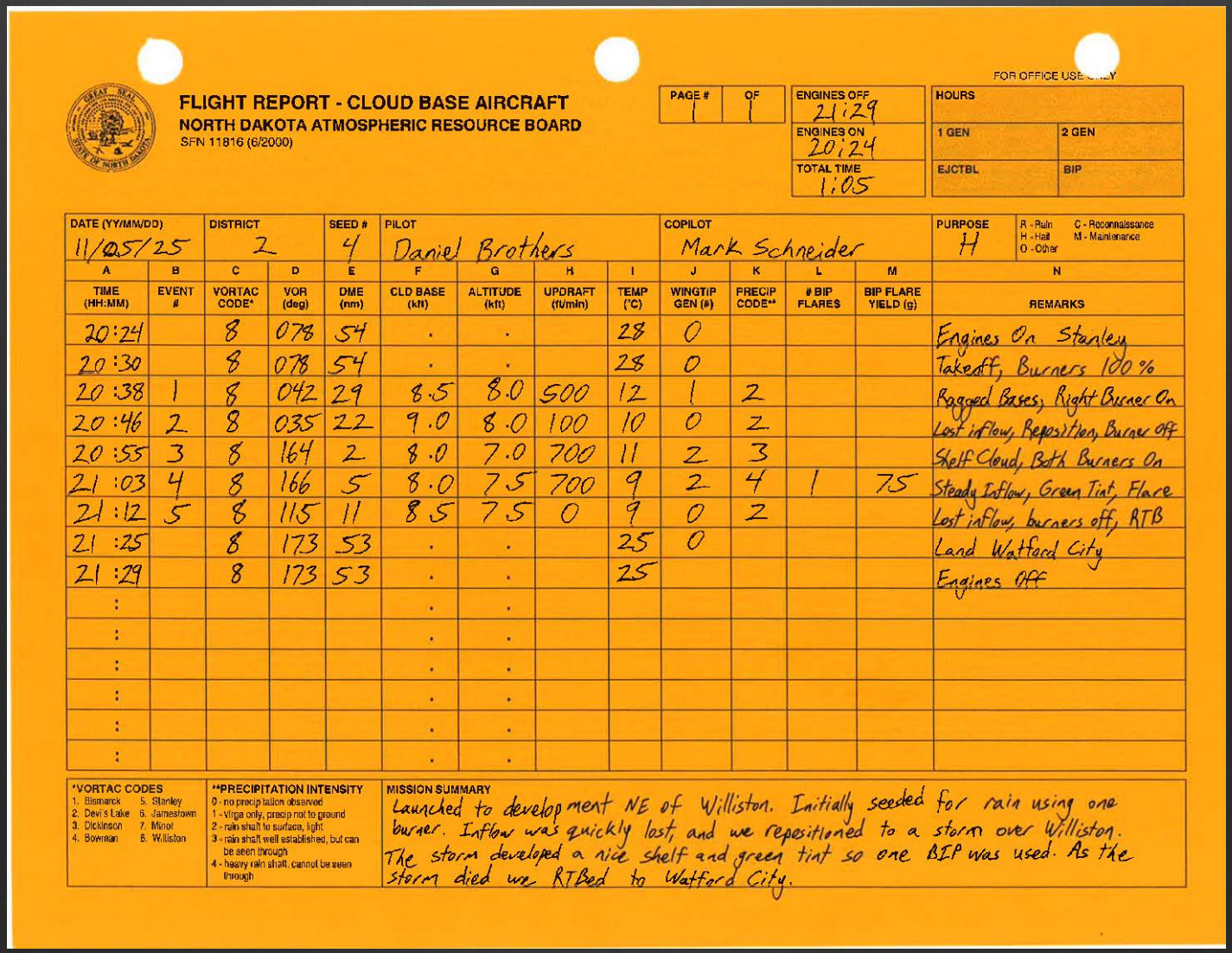
What's the Purpose?

- Seed 7 is launched to top, but only observes short fair weather cumulus. RTBs without seeding.
  - Recon
- Seed 2 aggressively lights one burner on the towering cumulus over Rhame.
  - Rain
- Seed 5 conducts a burner check because they haven't flown in a while.
  - Maintenance

What's the Purpose

- Seed 4 lights both burners and lights some flares.
  - HAIL
- Seed 1 had to land in Dickinson after a flight. Their return flight to Bowman.
  - Other

Paperwork



FLIGHT REPORT - CLOUD BASE AIRCRAFT
NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD
SFN 11816 (6/2000)

FOR OFFICE USE ONLY

PAGE #	OF
1	1

ENGINES OFF	21:29
ENGINES ON	20:24
TOTAL TIME	1:05

HOURS	
1 GEN	2 GEN
EJCTBL	BIP

DATE (YY/MM/DD)	DISTRICT	SEED #	PILOT	COPILOT	PURPOSE (R - Rain, H - Hail, O - Other, C - Reconnaissance, M - Maintenance)
11/05/25	2	4	Daniel Brothers	Mark Schneider	H

A	B	C	D	E	F	G	H	I	J	K	L	M	N
TIME (HH:MM)	EVENT #	VORTAC CODE*	VOR (deg)	DME (nm)	CLD BASE (kft)	ALTITUDE (kft)	UPDRAFT (ft/min)	TEMP (°C)	WINGTIP GEN (#)	PRECIP CODE**	# BIP FLARES	BIP FLARE YIELD (g)	REMARKS
20:24		8	078	54	.	.		28	0				Engines On Stanley
20:30		8	078	54	.	.		28	0				Takeoff, Burners 100%
20:38	1	8	042	29	8.5	8.0	500	12	1	2			Ragged Bases, Right Burner On
20:46	2	8	035	22	9.0	8.0	100	10	0	2			Lost inflow, Repositioned, Burner Off
20:55	3	8	164	2	8.0	7.0	700	11	2	3			Shelf Cloud, Both Burners On
21:03	4	8	166	5	8.0	7.5	700	9	2	4	1	75	Steady Inflow, Green Tint, Flare
21:12	5	8	115	11	8.5	7.5	0	9	0	2			Lost inflow, burners off, RTB
21:25		8	173	53	.	.		25	0				Land Watford City
21:29		8	173	53	.	.		25					Engines Off
:					.	.							
:					.	.							
:					.	.							
:					.	.							
:					.	.							
:					.	.							

*VORTAC CODES
1. Bismarck 5. Stanley
2. Devil's Lake 6. Jamestown
3. Dickinson 7. Minot
4. Bowman 8. Williston

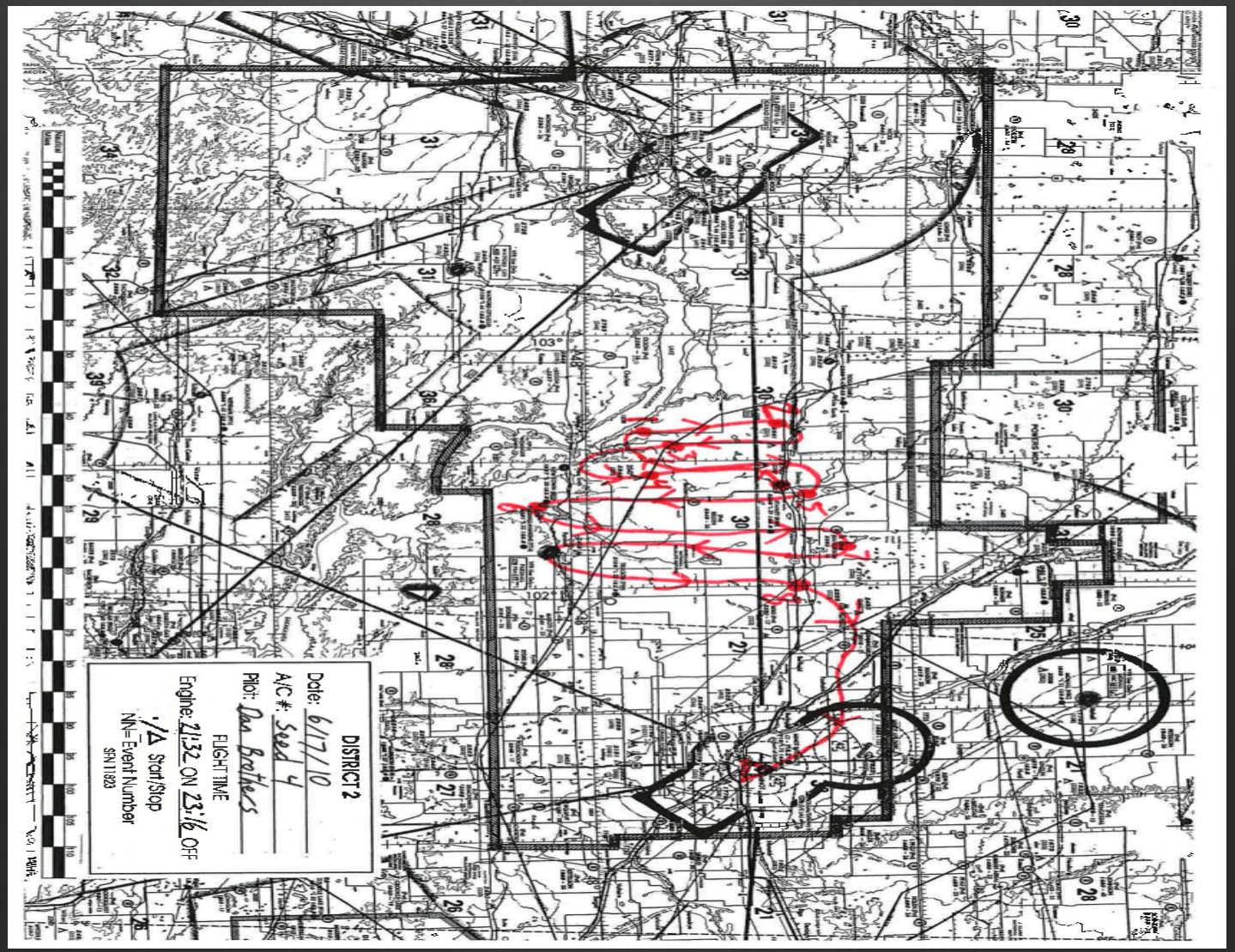
**PRECIPITATION INTENSITY
0 - no precipitation observed
1 - virga only, precip not to ground
2 - rain shaft to surface, light
3 - rain shaft well established, but can be seen through
4 - heavy rain shaft, cannot be seen through

MISSION SUMMARY
Launched to development NE of Williston. Initially seeded for rain using one burner. Inflow was quickly lost, and we repositioned to a storm over Williston. The storm developed a nice shelf and green tint so one BIP was used. As the storm died we RTBed to Watford City.

Paperwork

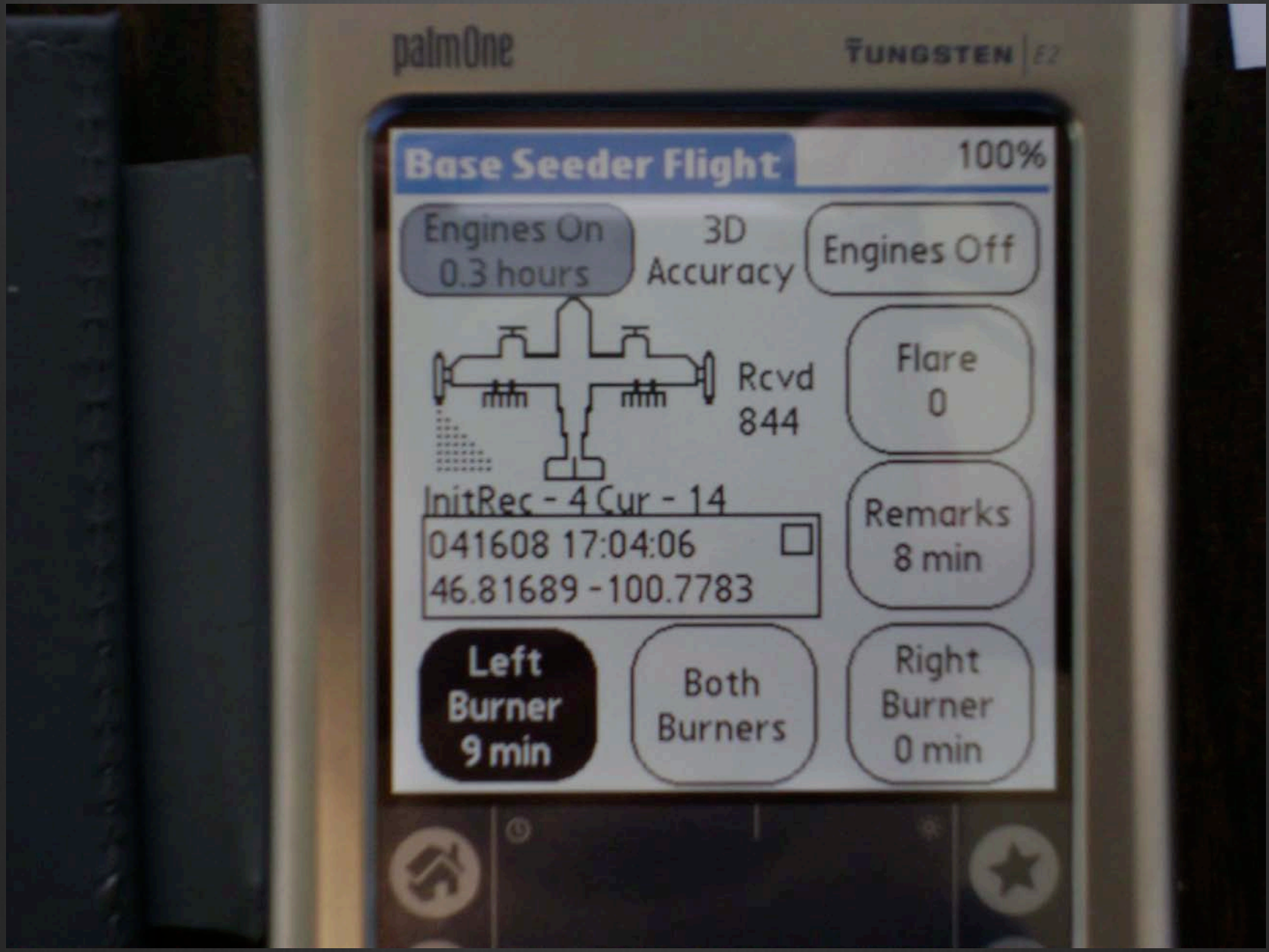
- Everybody is provided with some maps for each district.
- There needs to be a map for every flight.
  - If the GPS stops working for PARS you may need to draw the map for a flight form that is on the iPad. Be prepared for the possibility.
- Maps are drawn with the red felt tip pen provided.
- Events on the map should match events on the form.
- Fill in the info box with Date, A/C (Seed # is fine), Pilot, Engines On and Engines Off time.
- Keep maps neat and readable. Again, records are open to the public. Be professional.

Paperwork


DISTRICT 2
Date: 6/17/10
A/C #: Seed 4
Pilot: Dan Brothers
FLIGHT TIME
Engine: 21:32 ON 23:16 OFF
Δ Start/Stop
NN= Event Number
SFN 11823

Old PARS

Old PARS Equipment


palmOne
TUNGSTEN | E2
Base Seeder Flight
100%
Engines On
0.3 hours
3D
Accuracy
Engines Off
Rcvd
844
Flare
0
InitRec - 4 Cur - 14
041608 17:04:06
46.81689 -100.7783
Remarks
8 min
Left
Burner
9 min
Both
Burners
Right
Burner
0 min

FLIGHT REPORT

NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD

SFN 50864(12/2014)

ENGINES OFF	HOURS		PAGE #	OF
02:42:15	2.02		1	2
ENGINES ON	**DRY ICE RATE**	**1 GEN**	**2 GEN**	
00:41:00	0	0.00	0.87	
TOTAL TIME	**DRY ICE (lbs)**	**EJCTBL (grams)**	**BIP (grams)**	
02:01:15	0.00	0	450	

DATE	DISTRICT	SEED #	PILOT	COPILOT	PURPOSE	R - Rain H - Hail O - Other M - Maintenance C - Reconnaissance
June 2, 2005	1	1	Jason Akina		H	

Time (HH:MM)	EVENT #	LATITUDE (deg)	LONGITUDE (deg)	CLD BASE (kft)	ALTITUDE (KFT)	UPDRAFT (FT/MIN)	TEMP (°C)	PRECIP CODE**	DRY ICE (sec)	FLARES EJC	FLARES BIP	WINTIP GEN (#)	REMARKS
00:41:00		46.18383	-103.4268		2.8					0	0	0	Engines on in Bowman.
00:51:15		46.17180	-103.3990		3.3					0	0	0	
00:58:10		46.17375	-103.3086	8	7.2	0				0	0	0	
01:05:00	1	46.36952	-103.1195		8.8	500	10	1		0	0	2	Two burners on.
01:13:13	2	46.39356	-103.0816		8.3	0				0	0	0	Two burners off.
01:21:52		46.09642	-103.2415		8.0	0				0	0	0	
01:24:28	3	46.00716	-103.2847		8.1					0	0	2	Two burners on.
01:26:07	4	45.96891	-103.3281		8.3	400		2		0	1	2	BIP lit.
01:32:30	5	46.00535	-103.3277		8.9	200				0	1	2	BIP lit.
01:40:46	6	46.03755	-103.2380	9	9.1	700				0	1	2	BIP lit.
01:45:56	7	46.08233	-103.1682		9.5	0				0	1	2	BIP lit.
01:54:26	8	46.01844	-103.0616		9.6	800	10			0	1	2	BIP lit.
02:02:17	9	46.21321	-102.9349	8	8.8	600				0	1	2	BIP lit.

**PRECIPITATION INTENSITY

0 - No Precipitation
1 - virga only, precip not to ground
2 - rain shaft to surface, light
3 - rain shaft well established, but can be seen through
4 - heavy rain shaft, cannot be seen through

MISSION SUMMARY

lauched to the S part of the district to seed a line of new developement moving in from the SW. this new line started to developed and run up through the N part of the district. I approached the cell by seeding in the front part of the cell flying N and S tucked up against the shelf cloud. It was probably the biggest shelf I ve seen since being with WMI. proceeded to seed in front of the cell till the end of the W buffer then RTB to the south around the storm.

FLIGHT REPORT

NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD

SFN 50864(12/2014)

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02:01:15	0.00	0	450	

DATE	DISTRICT	SEED #	PILOT	COPILOT	PURPOSE	R - Rain H - Hail O - Other M - Maintenance C - Reconnaissance
June 2, 2005	1	1	Jason Akina		H	

Time (HH:MM)	EVENT #	LATITUDE (deg)	LONGITUDE (deg)	CLD BASE (kft)	ALTITUDE (KFT)	UPDRAFT (FT/MIN)	TEMP (°C)	PRECIP CODE**	DRY ICE (sec)	FLARES EJC	FLARES BIP	WINTIP GEN (#)	REMARKS
02:12:30	10	46.19355	-102.7903		9.3	0				0	0	0	Two burners off.
02:16:38		46.12243	-102.6910		9.3	0				0	0	0	
02:17:29		46.09520	-102.6750		9.3	0				0	0	0	
02:28:17		45.96544	-102.9941		7.3					0	0	0	
02:38:58		46.18854	-103.4312		2.8					0	0	0	
02:42:15		46.18464	-103.4266		2.8					0	0	0	Engines off in Bowman.

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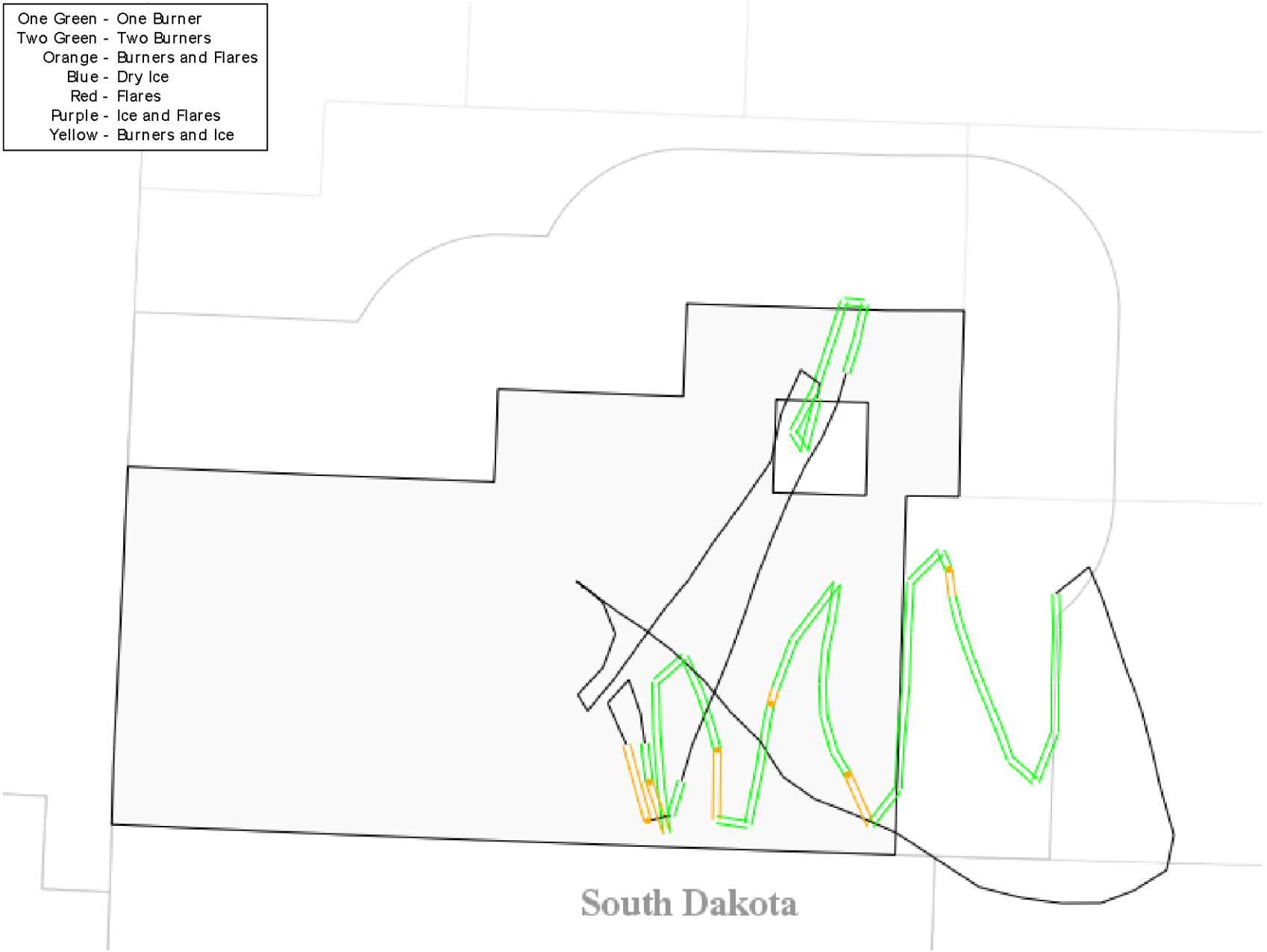
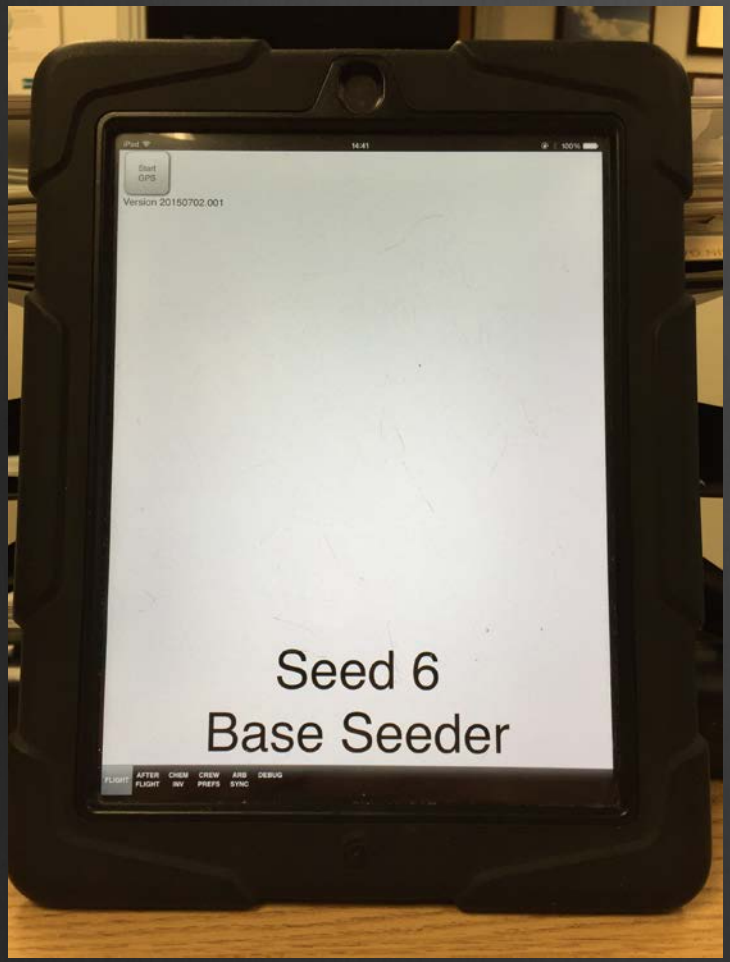
Seed 1 on 6/2/05 at 00:41:00z

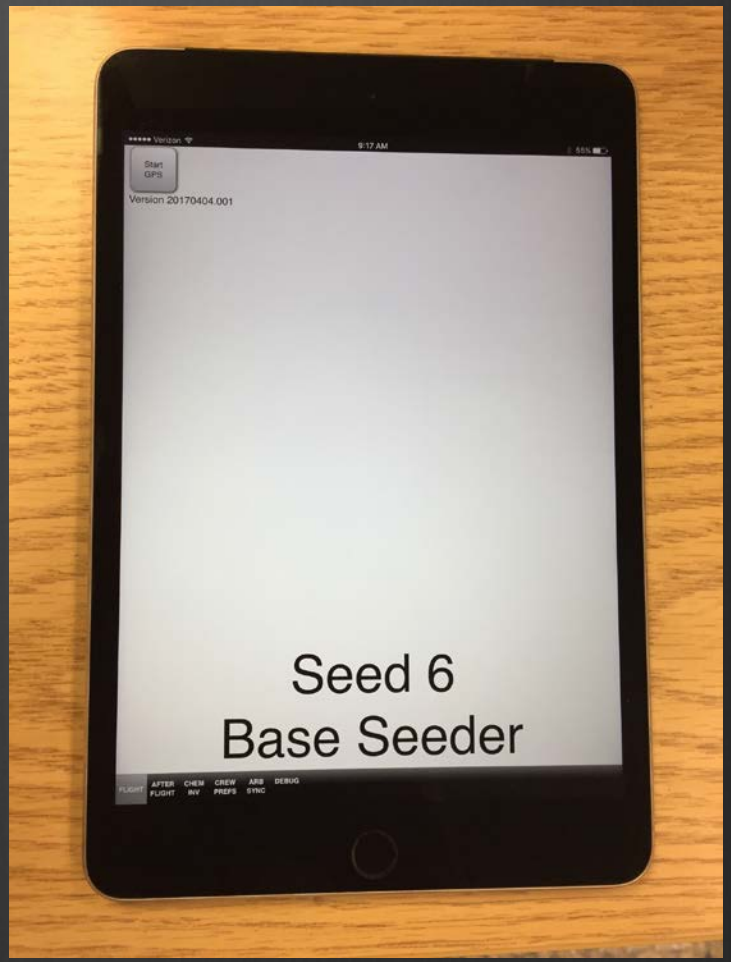


New PARS

iPad (3rd Gen)



iPad Mini (4th Gen)



FLIGHT REPORT

NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD

SFN 50864(12/2014)

ENGINES OFF	HOURS		PAGE #	OF
00:54:35	1.86		1	2
ENGINES ON	**DRY ICE RATE**	**1 GEN**	**2 GEN**	
23:03:01	0	0.00	1.19	
TOTAL TIME	**DRY ICE (lbs)**	**EJCTBL (grams)**	**BIP (grams)**	
01:51:34	0.00	0	150	

DATE	DISTRICT	SEED #	PILOT	COPILOT	PURPOSE	R - Rain H - Hail O - Other M - Maintenance C - Reconnaissance
June 19, 2015	1	1	Vadim Alekseev	Zach Santee	H	

Time (HH:MM)	EVENT #	LATITUDE (deg)	LONGITUDE (deg)	CLD BASE (kft)	ALTITUDE (KFT)	UPDRAFT (FT/MIN)	TEMP (ºC)	PRECIP CODE**	DRY ICE (sec)	FLARES		WINTIP GEN (#)	REMARKS
										EJC	BIP		
23:04:23		46.16983	-103.3038		2.9					0	0	0	Engines on in Bowman.
23:14:28		46.12606	-103.5557		6.6					0	0	0	
23:23:26		46.13757	-104.0315	8	7.2	400	19	4		0	0	0	
23:25:29	1	46.22966	-104.0407	8	7.0	700	19	4		0	0	2	Two burners on.
23:26:16	2	46.26484	-104.0426	8	6.8	700	19	4		0	1	2	BIP lit.
23:36:18		46.16854	-103.9714		8.0					0	0	2	
23:37:13	3	46.20853	-103.9636	8.5	8.2	800	19	4		0	1	2	BIP lit.
23:47:36		46.10335	-103.9900	8.5	8.6	800	15	3		0	0	2	
00:08:48		46.04565	-103.7454		8.8					0	0	2	
00:18:54		46.02869	-103.5730		9.5					0	0	2	
00:23:37		46.03232	-103.4734	9.5	9.2	700	10	3		0	0	2	
00:33:42		46.03102	-103.4444		8.8					0	0	2	
00:36:51	4	46.01844	-103.3630	10	9.5		15	1		0	0	0	Two burners off.

****PRECIPITATION INTENSITY**

0 - No Precipitation
1 - virga only, precip not to ground
2 - rain shaft to surface, light
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MISSION SUMMARY

We launched to check out a storm on the MT border. It was a well defined supercell. We had good consistent inflow of 800 ft/min. We seeded for a little over an hour and then returned to base to refuel and rechem.

FLIGHT REPORT

NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD

SFN 50864(12/2014)

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00:54:35	1.86		2	2
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01:51:34	0.00	0	150	

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June 19, 2015	1	1	Vadim Alekseev	Zach Santee	H	

Time (HH:MM)	EVENT #	LATITUDE (deg)	LONGITUDE (deg)	CLD BASE (kft)	ALTITUDE (KFT)	UPDRAFT (FT/MIN)	TEMP (°C)	PRECIP CODE**	DRY ICE (sec)	FLARES EJC	FLARES BIP	WINTIP GEN (#)	REMARKS
00:46:55		46.12352	-103.3694		4.8					0	0	0	
00:54:35		46.17124	-103.3038		2.9					0	0	0	Engines off in Bowman.

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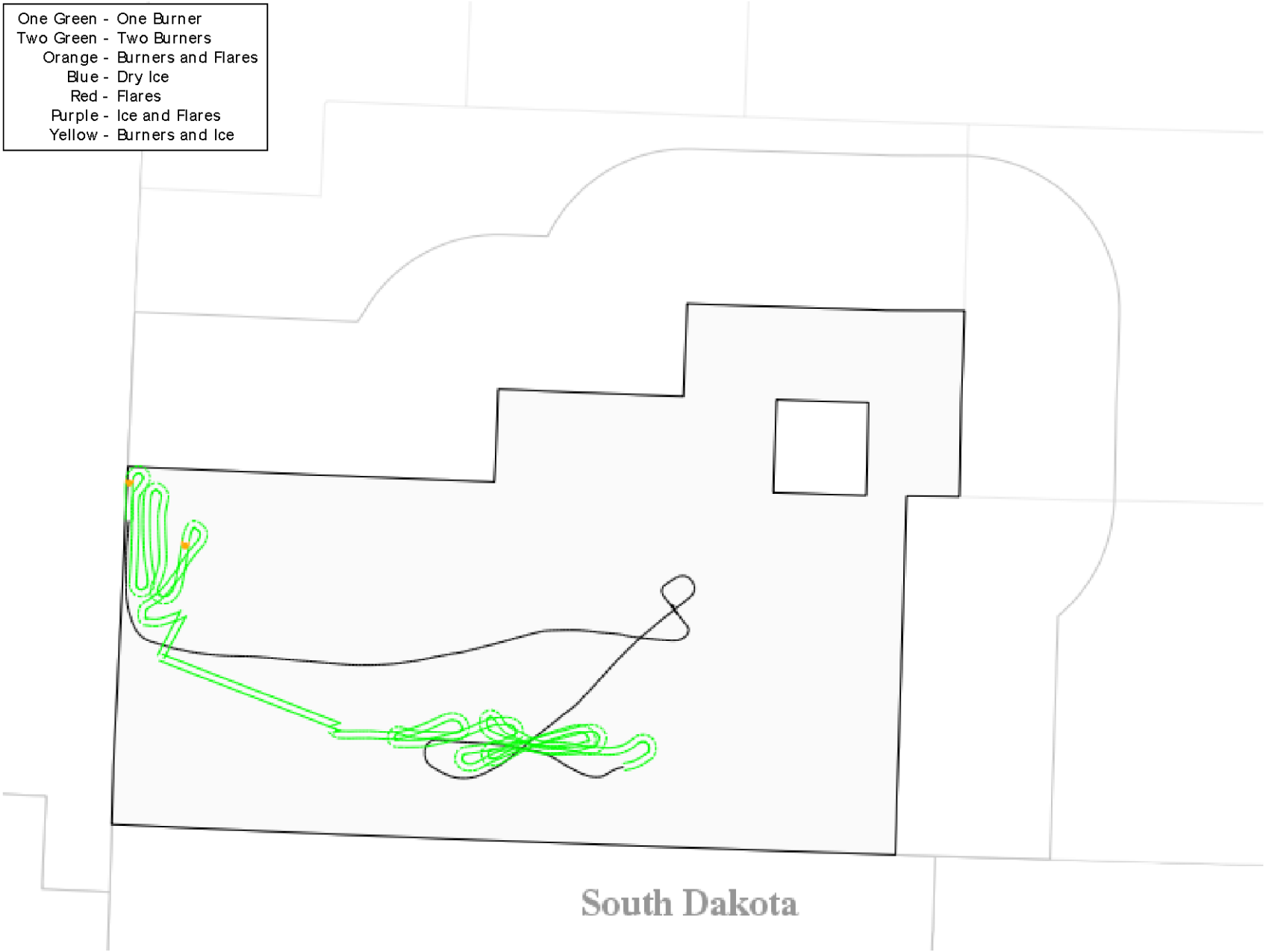
Seed 1 on 6/19/15 at 23:03:01z



Apps

- Good Reader
  - NDCMP Documents

- Foreflight
  - Available June 1
  - I'll send an email with log in info when setup

- Go ToMeeting
  - Video Chat service for briefings

- Other

PARS

- iPad should always be charged and ready to go.
- Bring the charging cord with you.
- Battery lasts longer with lower screen brightness.
- Location Services On for Safari
- WiFi OFF when running PARS
- Don’t Overheat iPad. Don’t leave on dash of car or plane

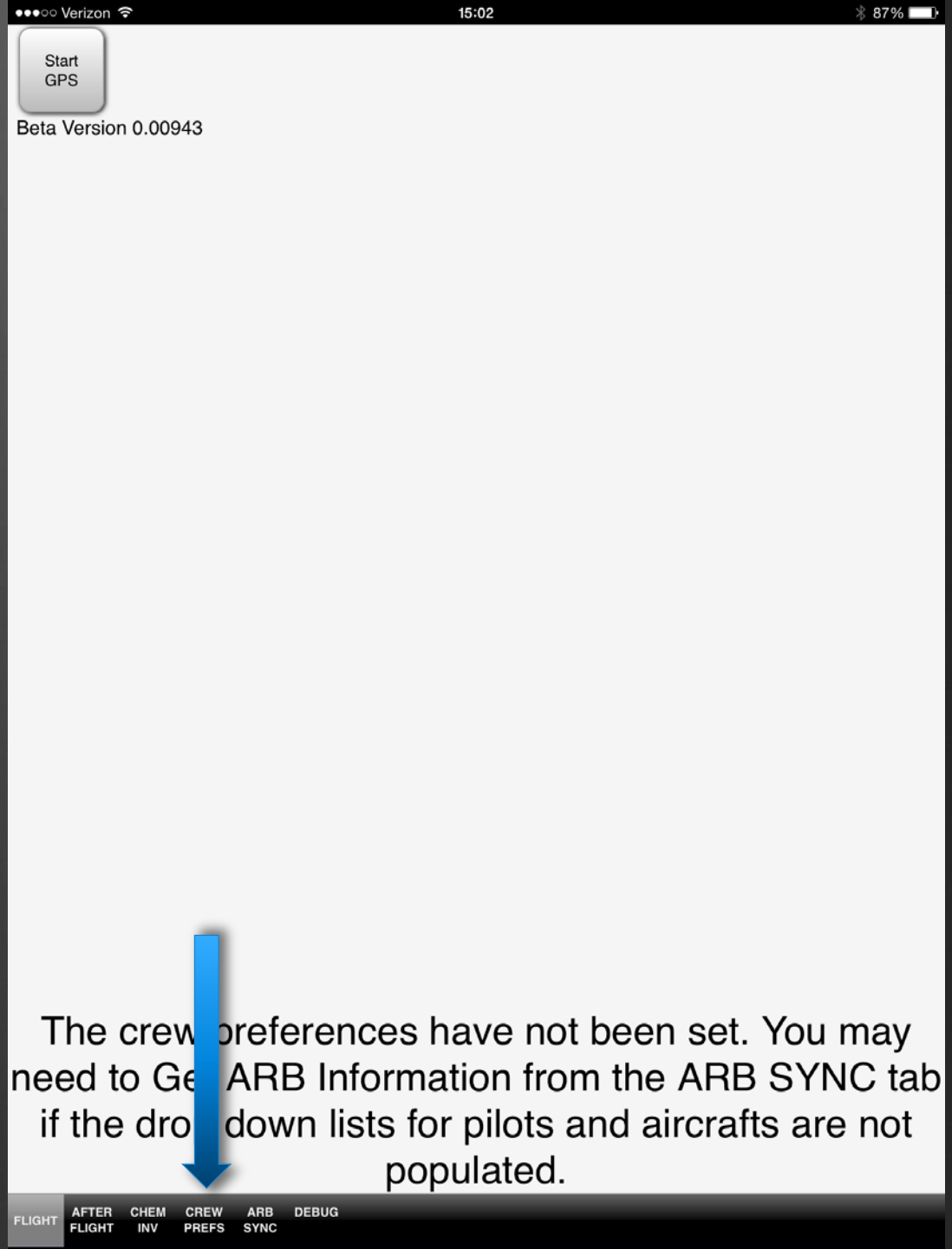
PARS

- GPS Flight Tracking WILL NOT WORK if you are not in the PARS app with the screen on.
- Select PARS!
- Always allow PARS to use current location. That's the GPS!
  - PARS is a web-based application, so you ALWAYS give Safari permission to use GPS as well, if asked.
- Turn off Cellular Data in settings.

PARS Homepage

Crew Preferences may not be set the first time you open PARS, or the preferences may not be accurate.

First Select Crew Prefs to set the Security Key



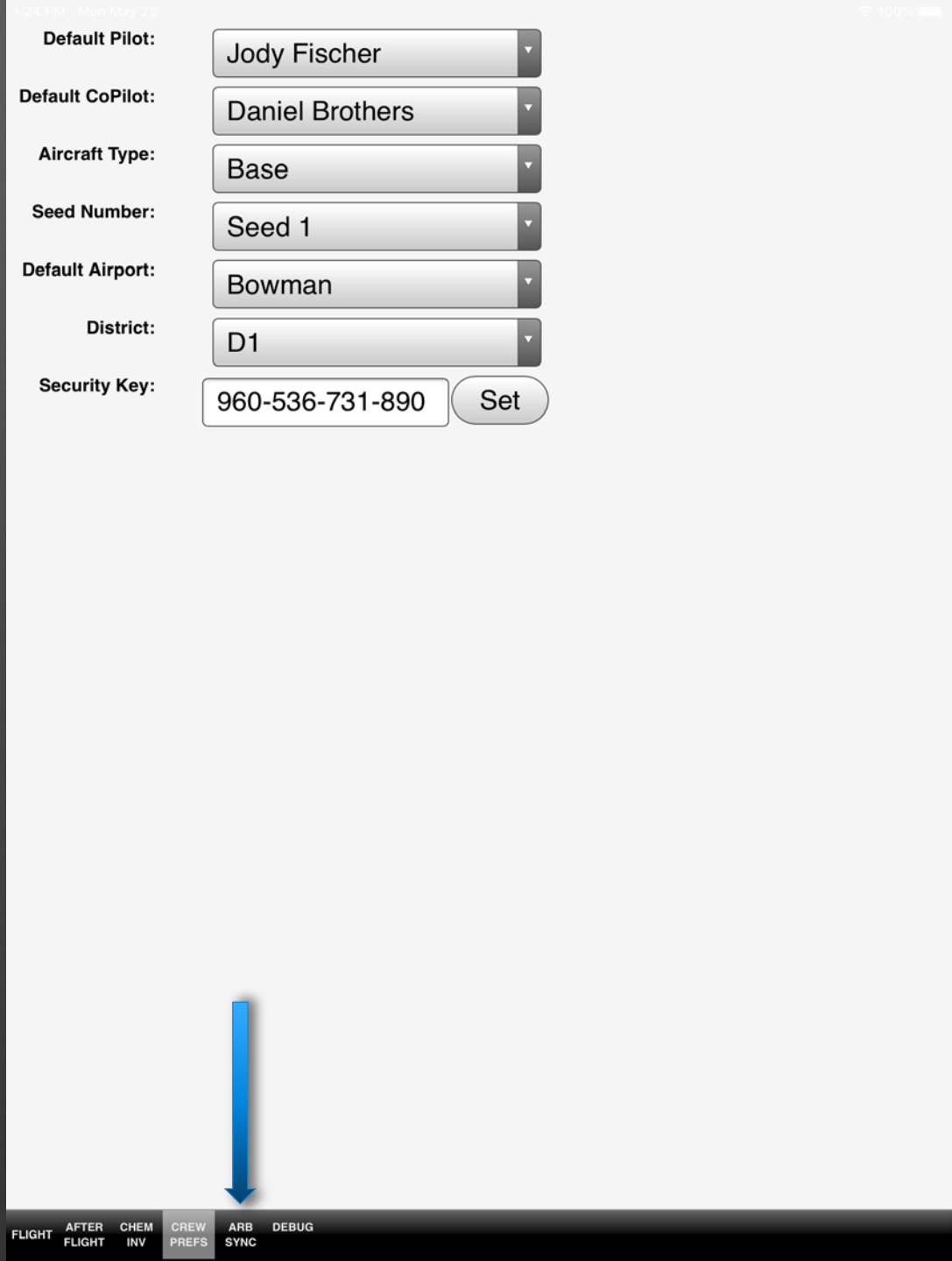
CREW PREFS

The Security Key is required to Download and Upload info to the Flight Database

Should already be set, but check to make sure.

If you need the Security Key, call Dan.

Next Select ARB SYNC to download the most up-to-date info from ARB. (Must be connected to Wi-Fi)

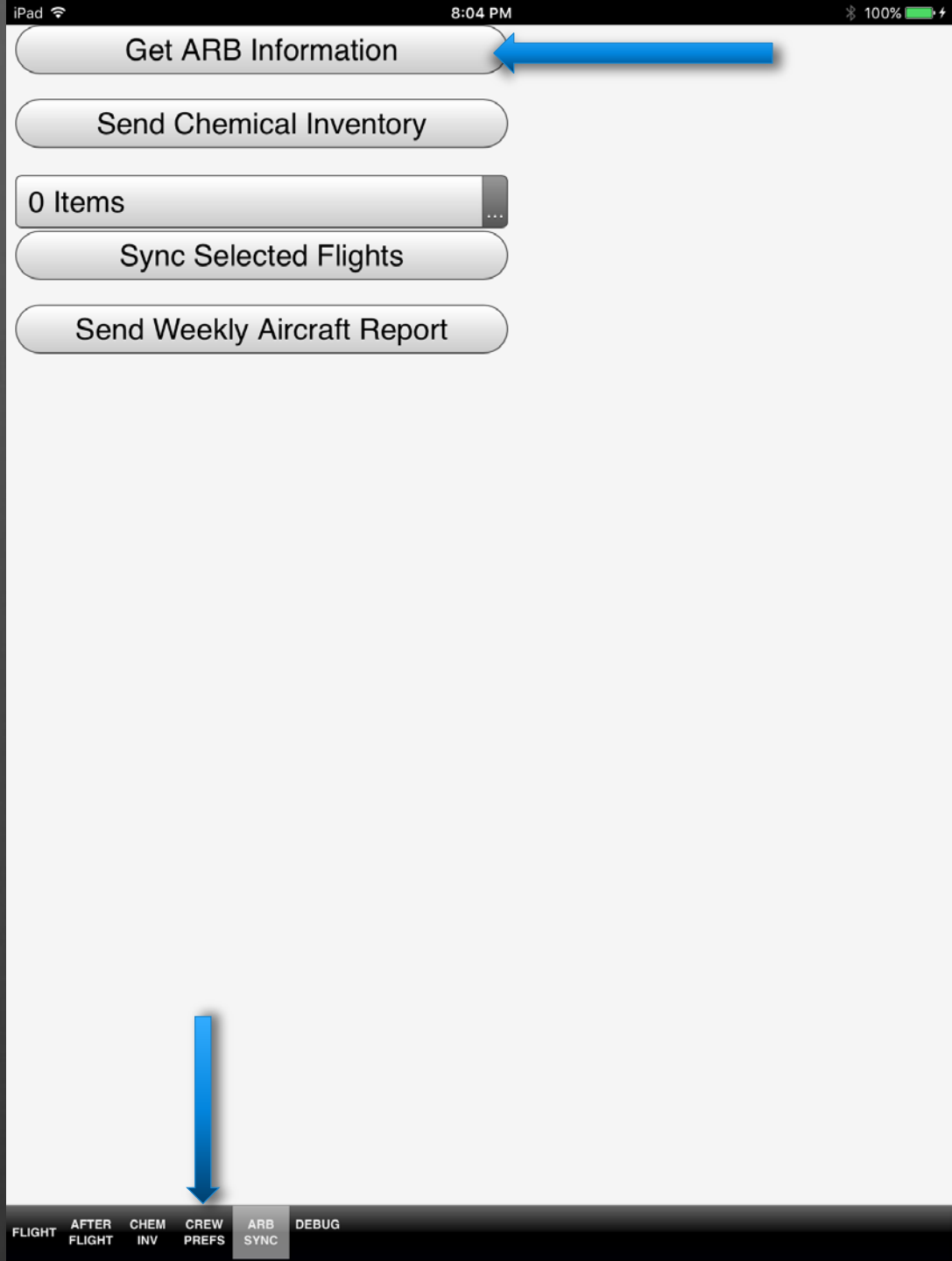


ARB SYNC

Get ARB Information

- Downloads info such as Pilot lists, Co-Pilot lists, and Airports.

After you Get ARB Information, select CREW PREFS from the bottom menu.

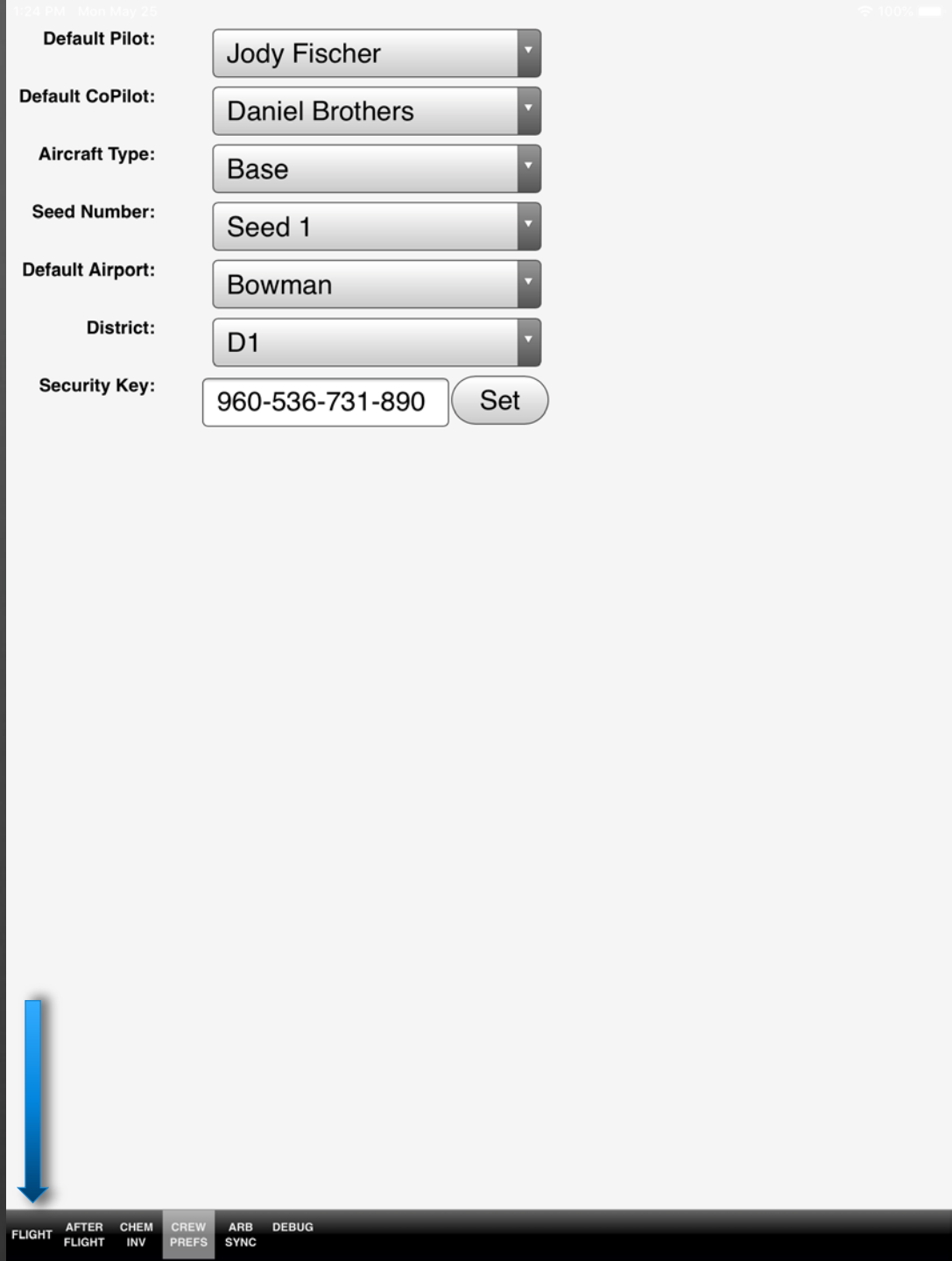


CREW PREFS

These menus let you select the basic information for your plane.

DO NOT change info for one flight or for a rotating vacation intern. These adjustments can and should be made in the Flight Info for that flight.

Once Preferences are set, select Flight from the bottom menu.



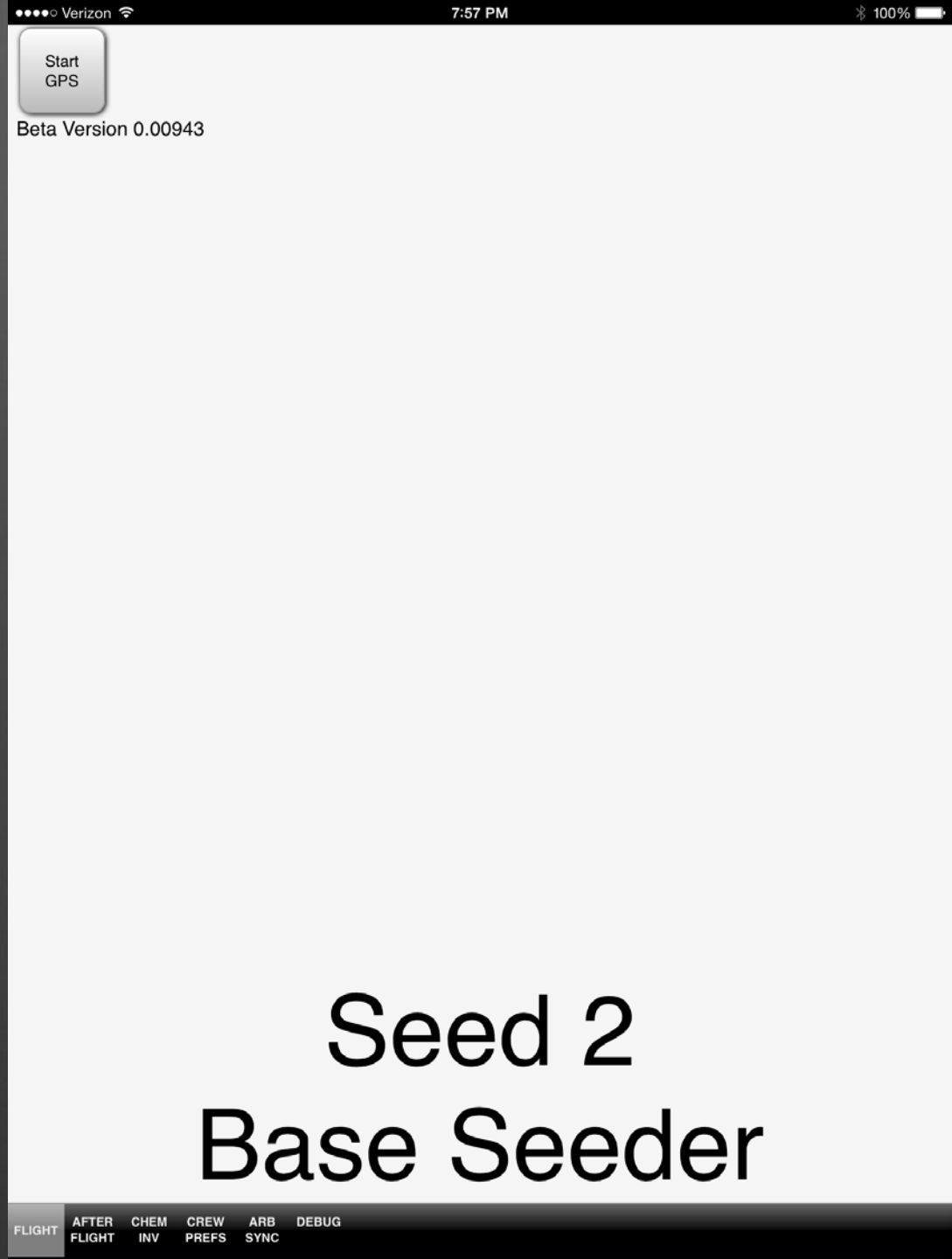
Flight

Anytime you are launched, Start GPS immediately.

- Before you even get to the plane.
- This gives the GPS a few minutes to get proper accuracy.

Many buttons require a double tap to work. The first tap darkens the button. The second tap confirms the button.

- Helps prevent mistakes in bumpy airplanes.

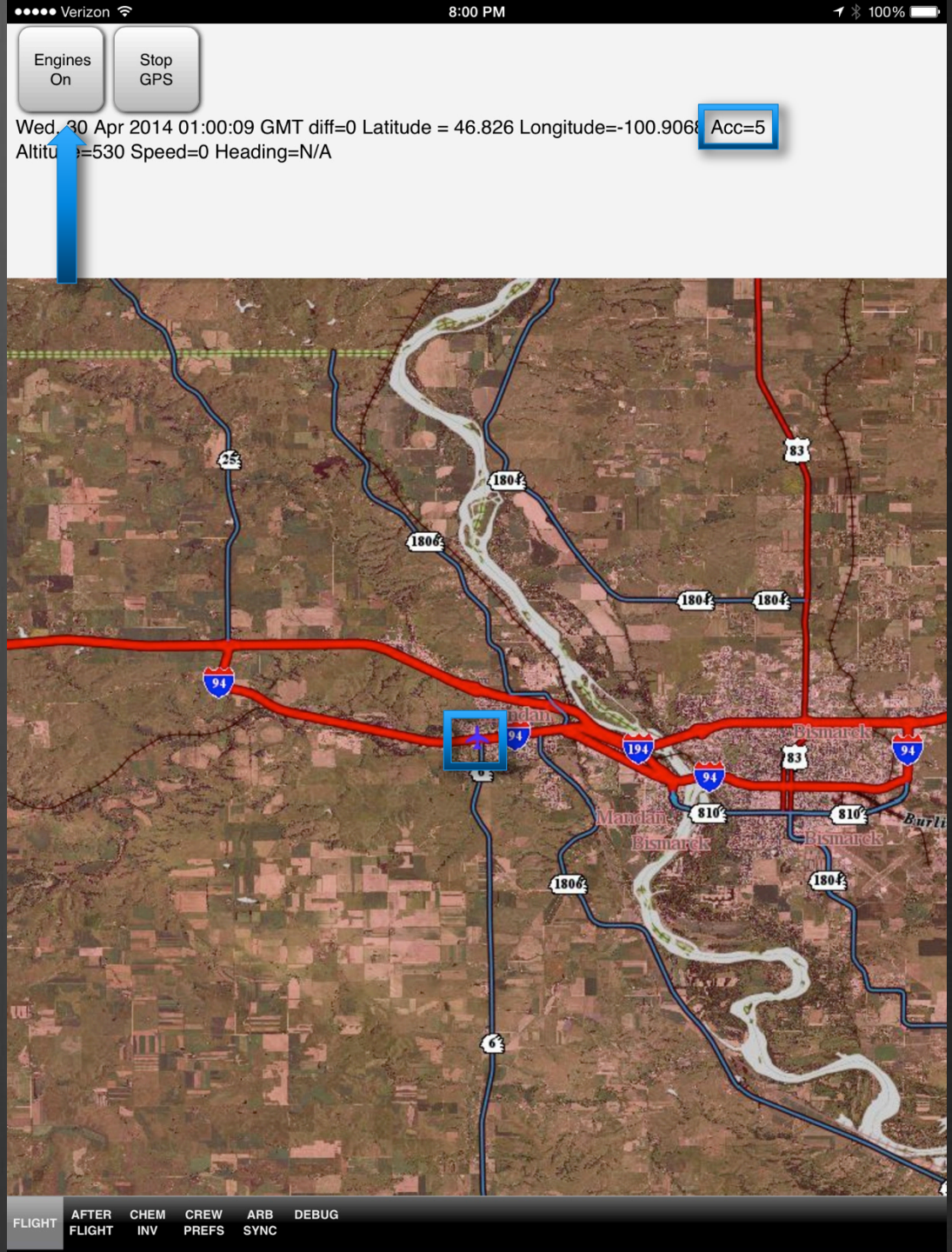


Flight

Once GPS is turned on the map appears showing your current location.

GPS accuracy should be at least 10 before Engines On.

Press Engines On as close as possible to actual Engines On of the airplane.

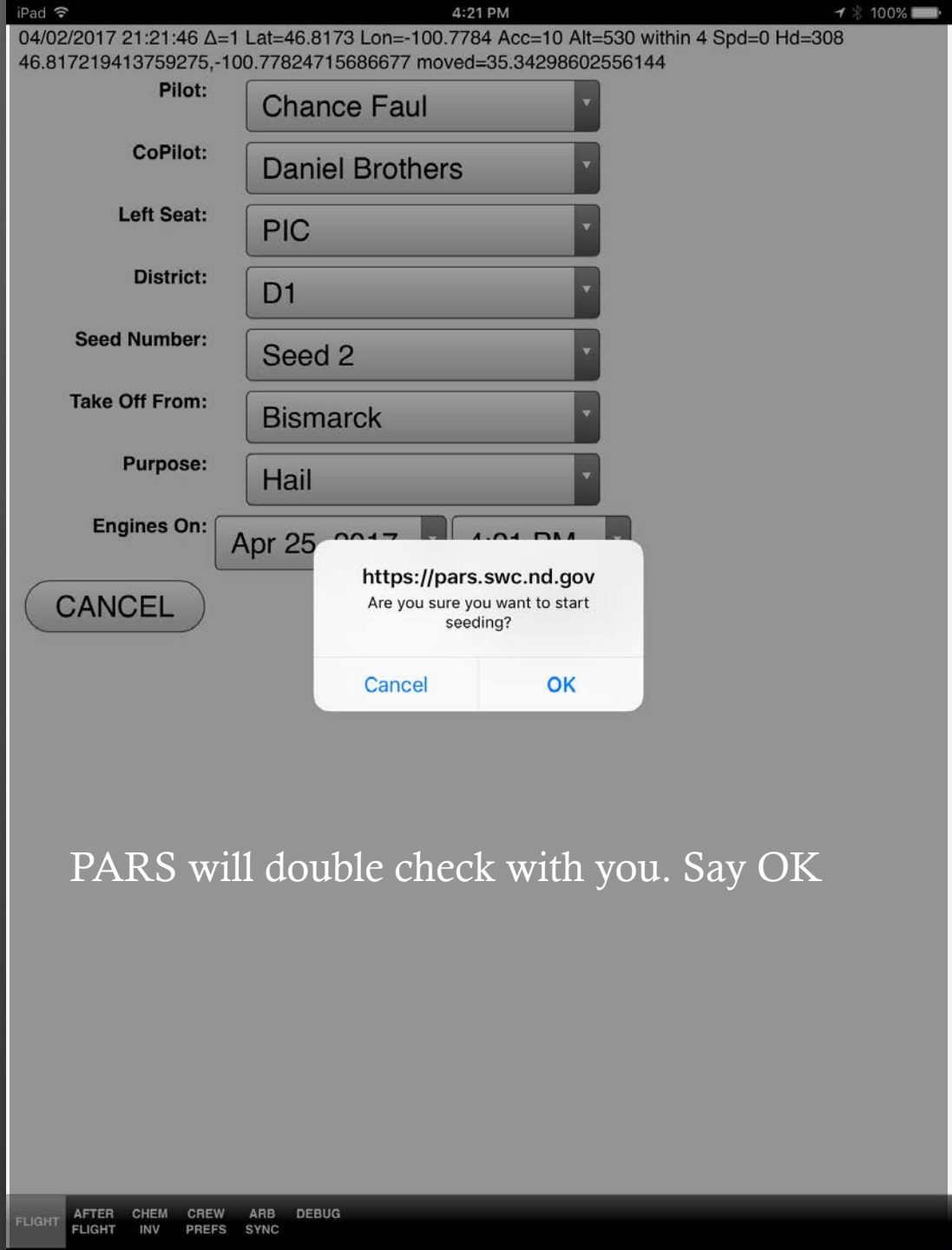


Flight

Select/Change the necessary fields.

- Left Seat must be selected as either PIC or Intern. Who is sitting in the left seat.
- Purpose must be selected. Use Recon if not sure. Can be changed during or after flight as well.
- Engines On Date and Time must be selected. If you pushed Engines On at the correct time minimal adjustment should be needed.

When all info is correct push START.

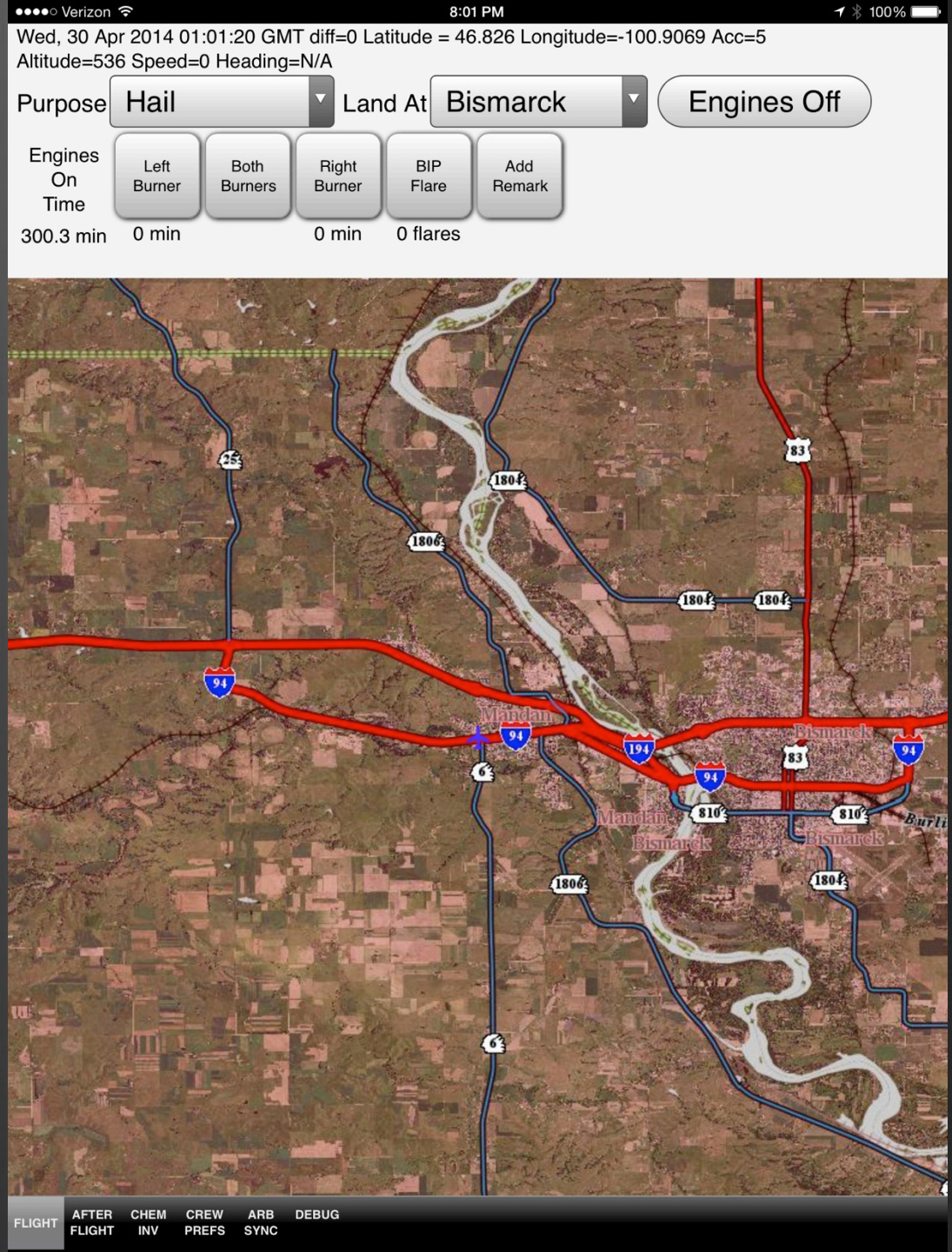


PARS will double check with you. Say OK

Base Seeder

Options for Left Burner, Right Burner, Both Burners, BIP Flares, and Add Remark.

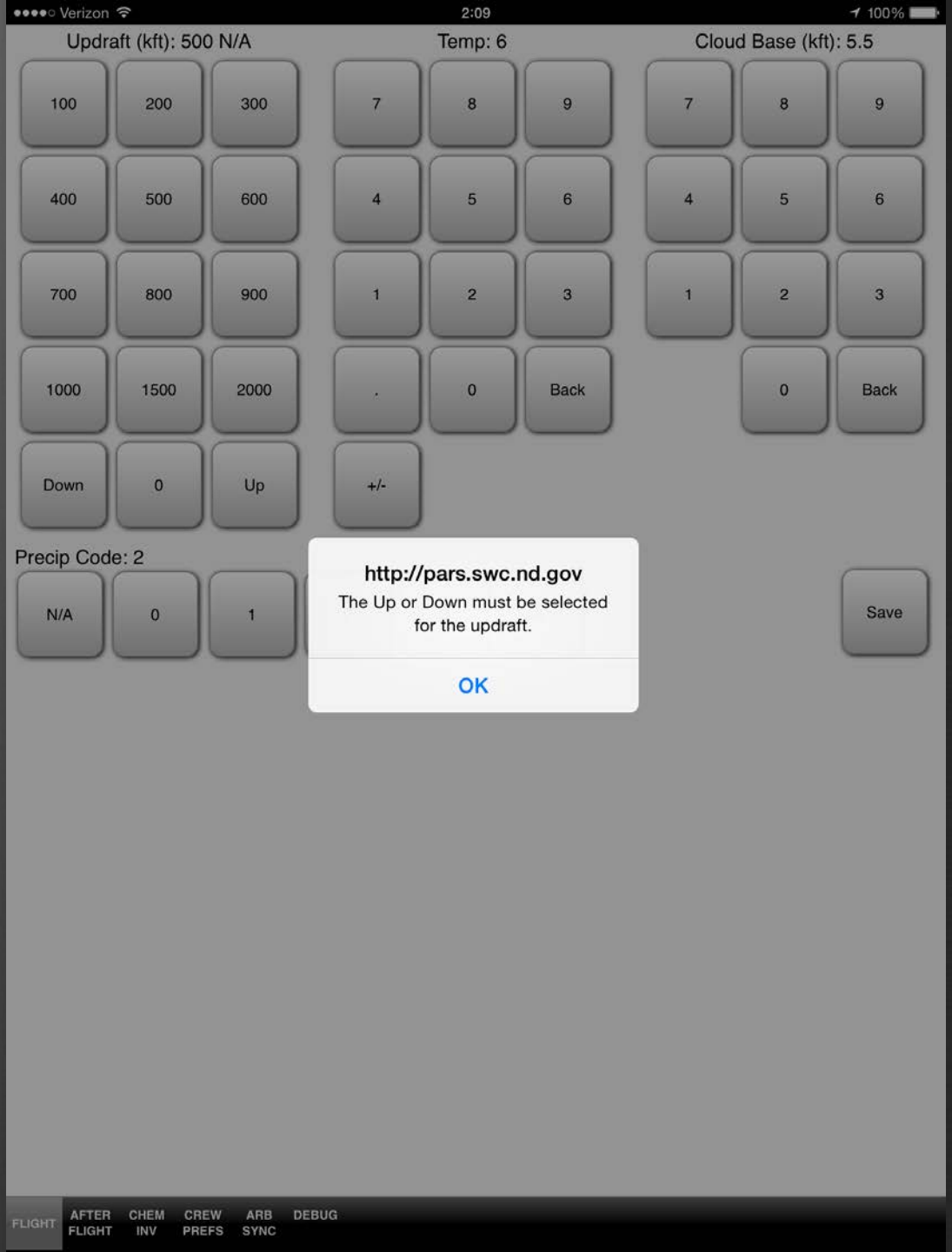
- Push Buttons as actions actually occur in flight. This will give us the most accurate chem usage and physical position of events.
- Remarks should be entered at least once every 10 minutes, even if no event occurs.
- Any time an event occurs the iPad will automatically prompt you for Remarks.



Remarks

Remarks include Updraft, Temp, Cloud Base, and Precip Code.

- Updraft: Nearest 100 kft. Leave as N/A in clear skies.
- Temp: Must be entered. Air temp in degrees Celsius.
- Cloud Base: Leave as N/A if there are no clouds. Will automatically place the decimal point. (ex: Entering 65 produces a 6.5 kft cloud base height.)
- Precip Code: Use N/A for no clouds.
- SAVE!



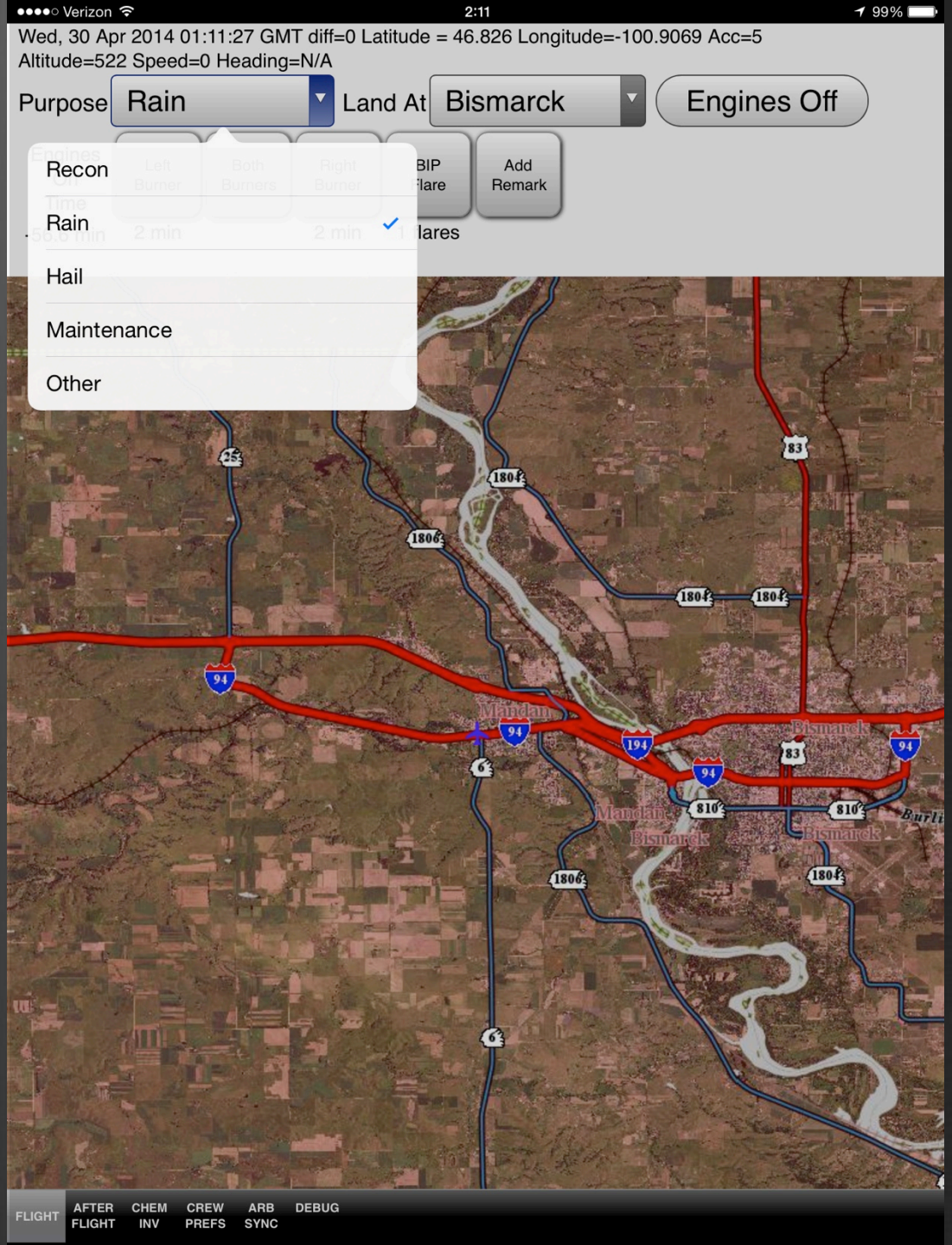
Base Flight

Counters keep track of chem usage

- Burners are tracked in minutes
- Flares are # of flares used

Flight time is also tracked in minutes.

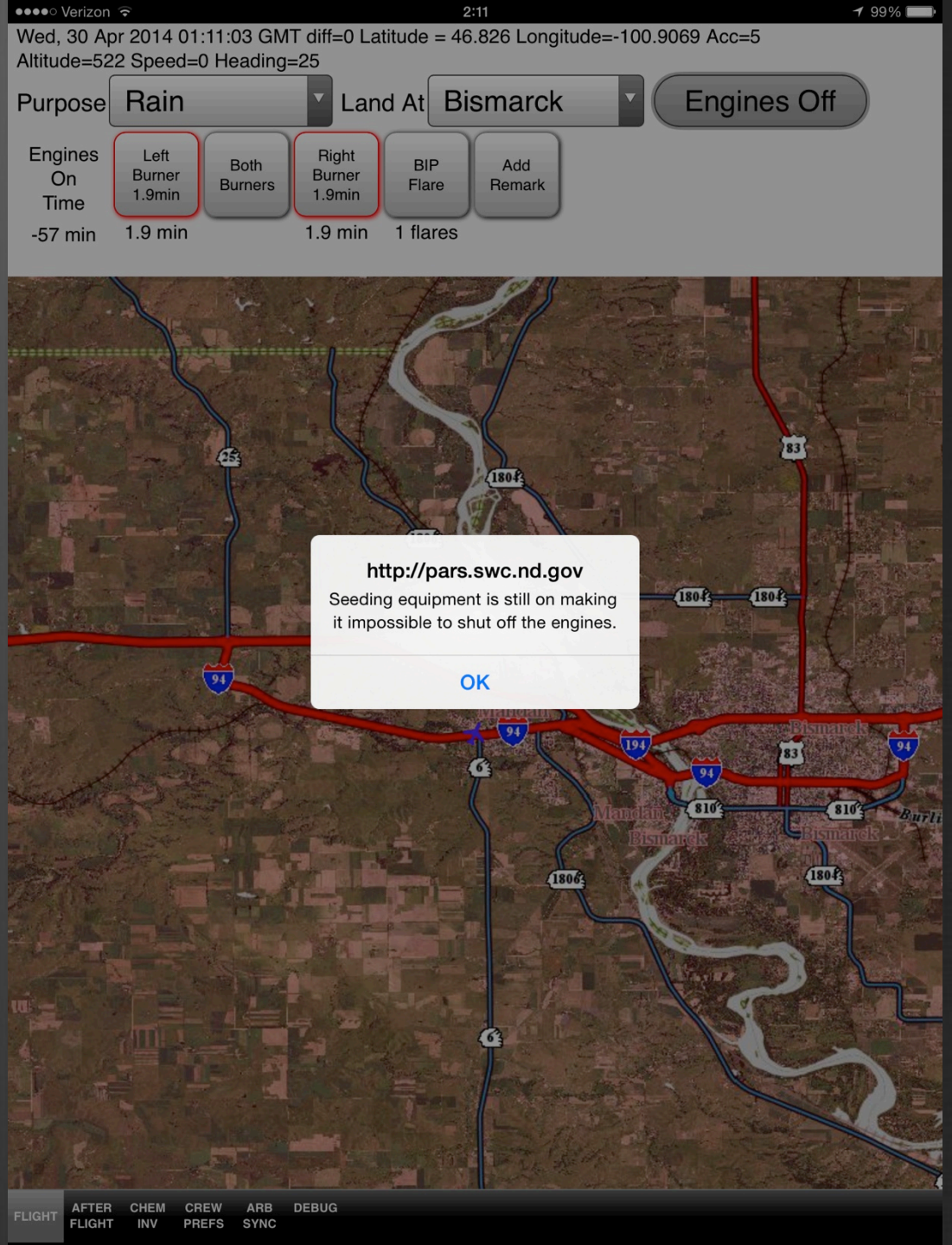
If purpose changes, you can change it with a drop-down menu.



Base Flight

Make sure all seeding equipment is off before trying to turn off Engines

Hopefully, this isn't a problem since you are entering what happens in flight, and you wouldn't be landing with burners still on.

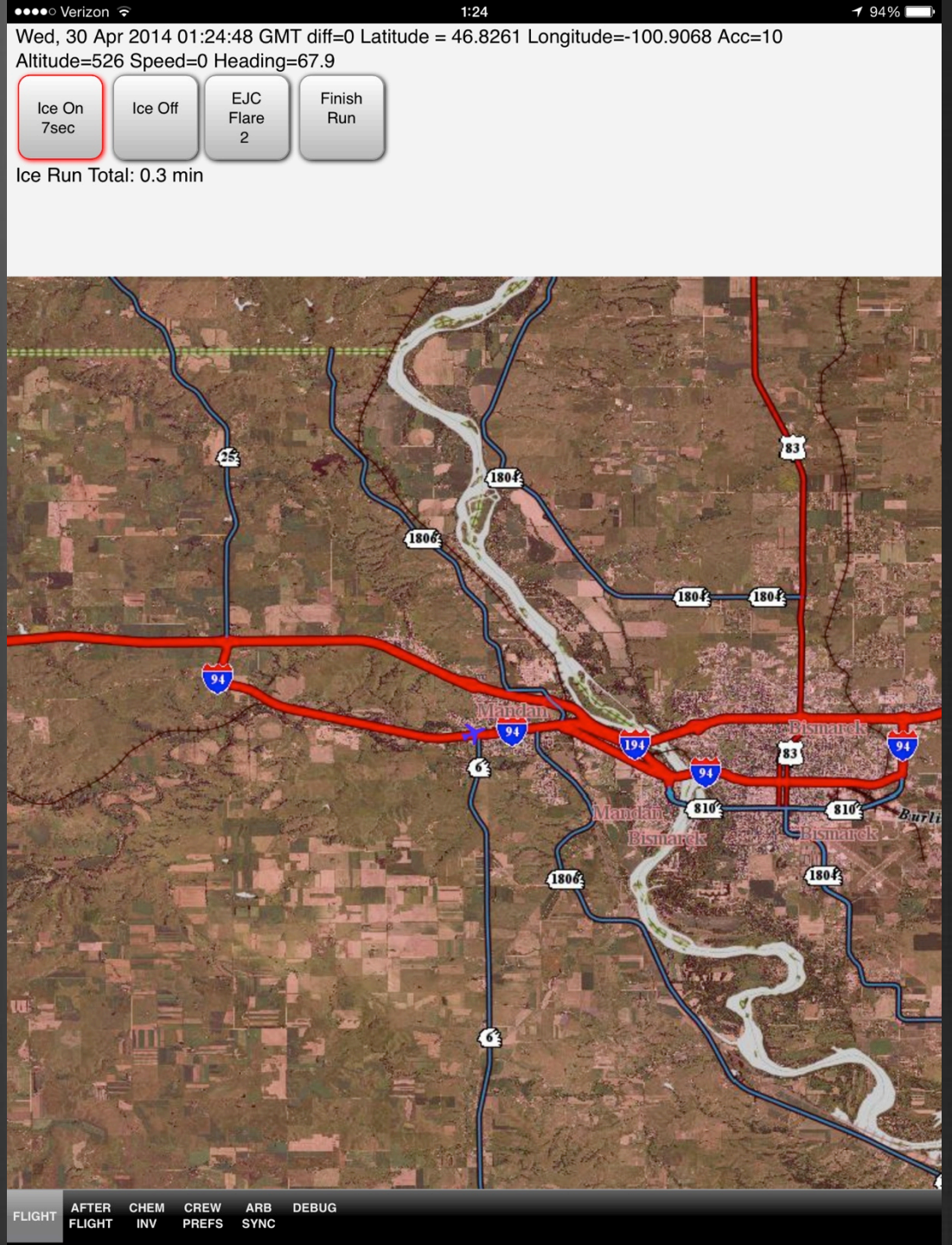


Top Flight

The King Air uses Dry Ice, Ejectable Flares, and BIP Flares, but does not have burners. Does not seed at Base.

When selecting Ice or EJC you start a “Run”.

- If you pressed Ice, the Ice will already be On.
- If you pressed EJC the Ice will be Off.
- Counters keep track of Ice time and flares used.



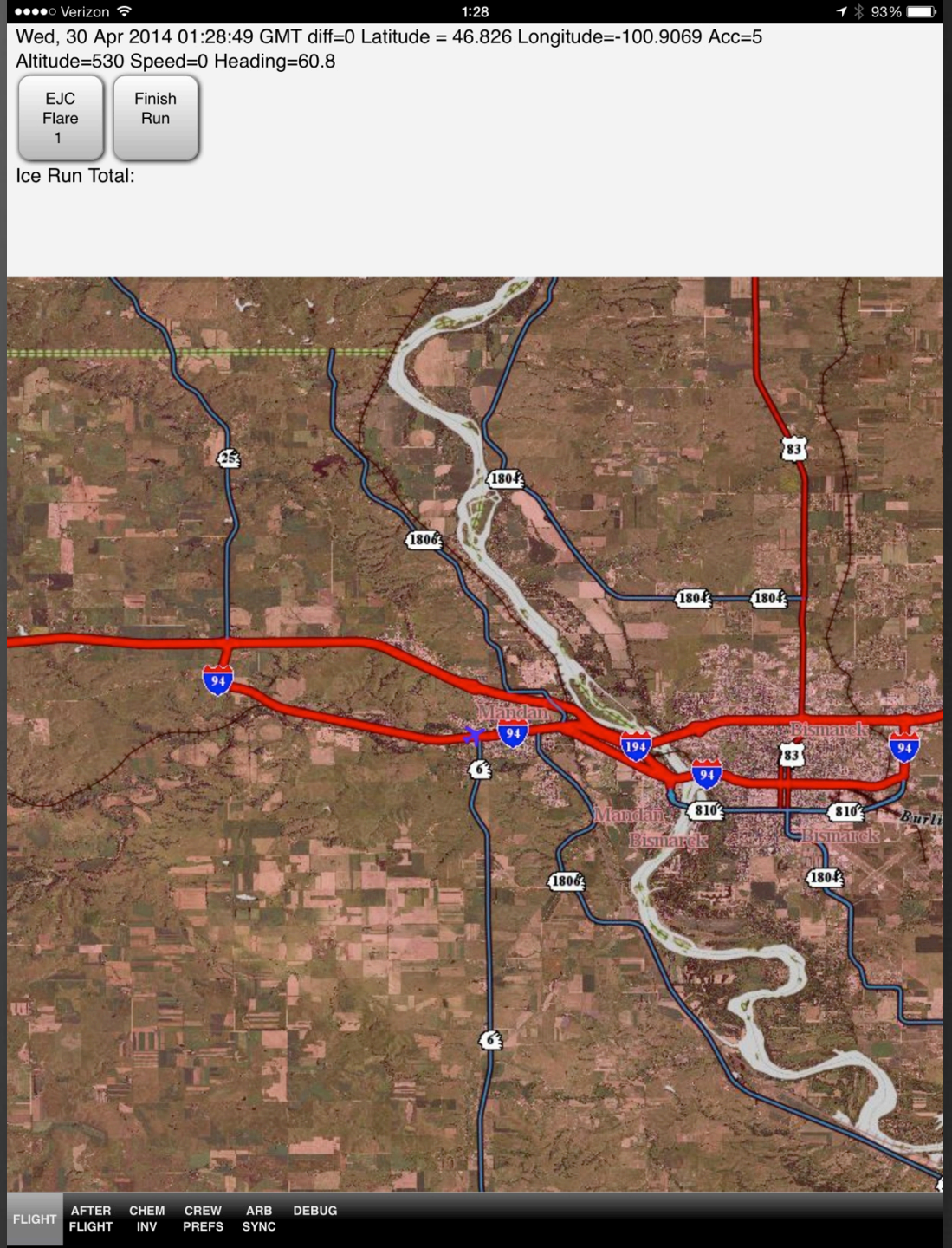
Hybrid Flight

The Hybrid planes have EJC Flares, BIP Flares, and burners, but no ice. Can be used at both base or top, depending on circumstances.

Selecting EJC starts a “Run”.

Make sure to Finish Run if it will be several minutes until the next run takes place.

Remarks are only entered after finishing a run.

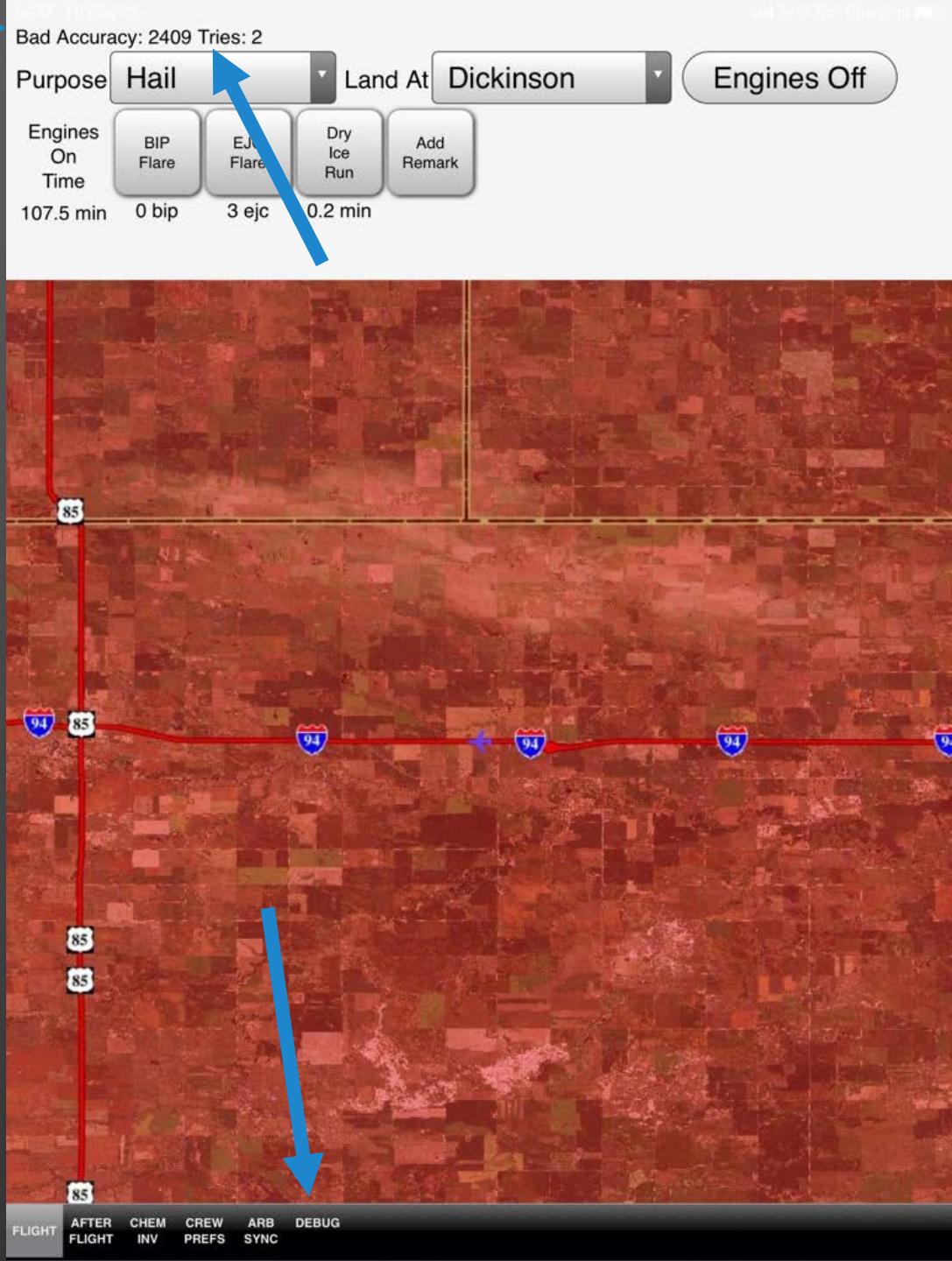


Bad GPS Issue

If GPS is working, you have a bunch of data at the top of the screen.

If GPS stops working, the data is replaced by a “Bad Accuracy” alert. (Or if Acc > 10)

If GPS does not reconnect within 30 seconds (or 4 Tries), click on DEBUG.



Bad GPS Issue

On the DEBUG page, select "Reset GPS".

- You won't see anything really happen on this page, but that's ok.

Go back to "Flight" and the GPS should reconnect and start updating again.

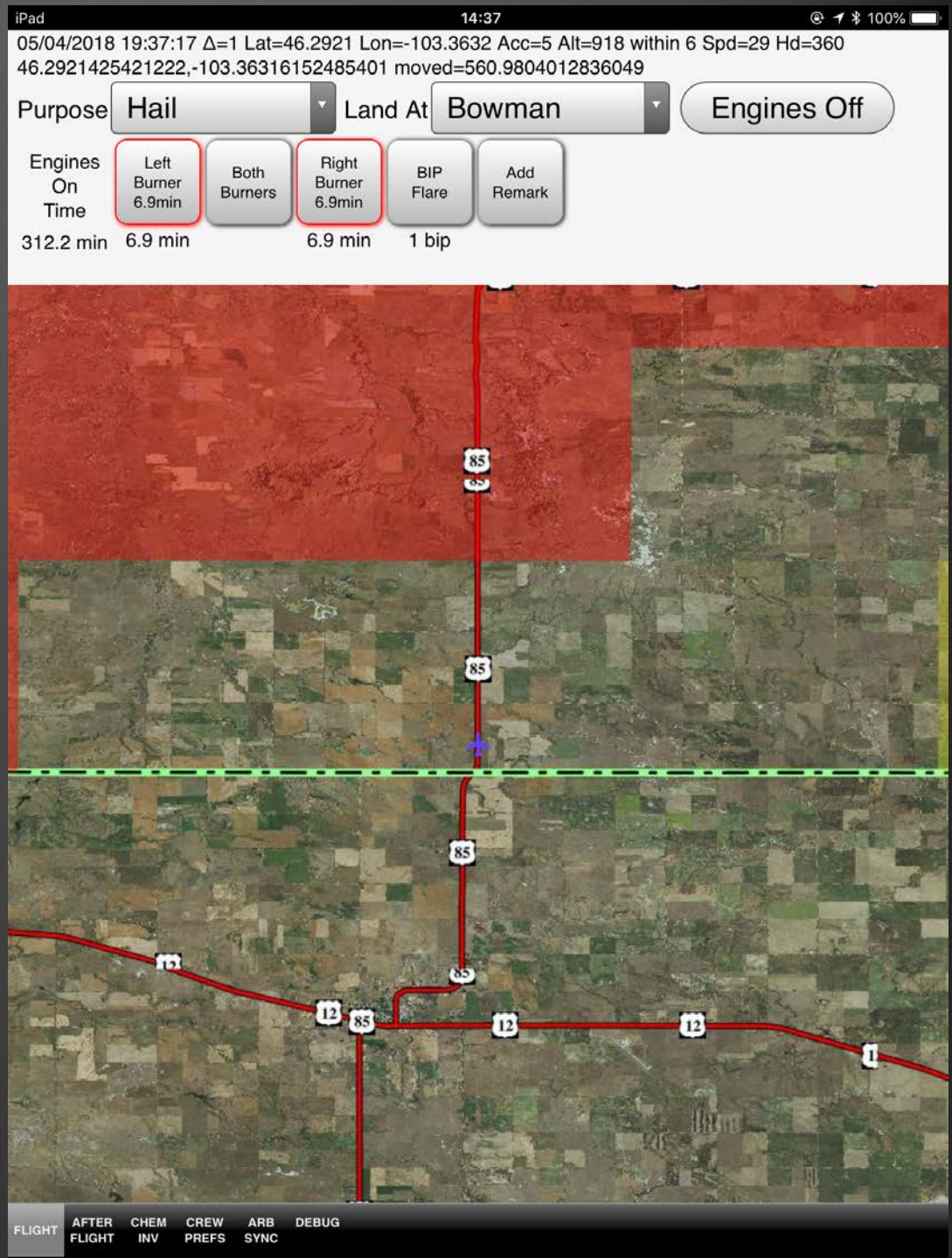
Map Shading

Target areas have no shading.

Buffer Zones have a light green shading (Not Shown).

Non-Operational areas have a red shading.

Red means No Seeding.



After Flight

Select AFTER FLIGHT from the bottom Menu.

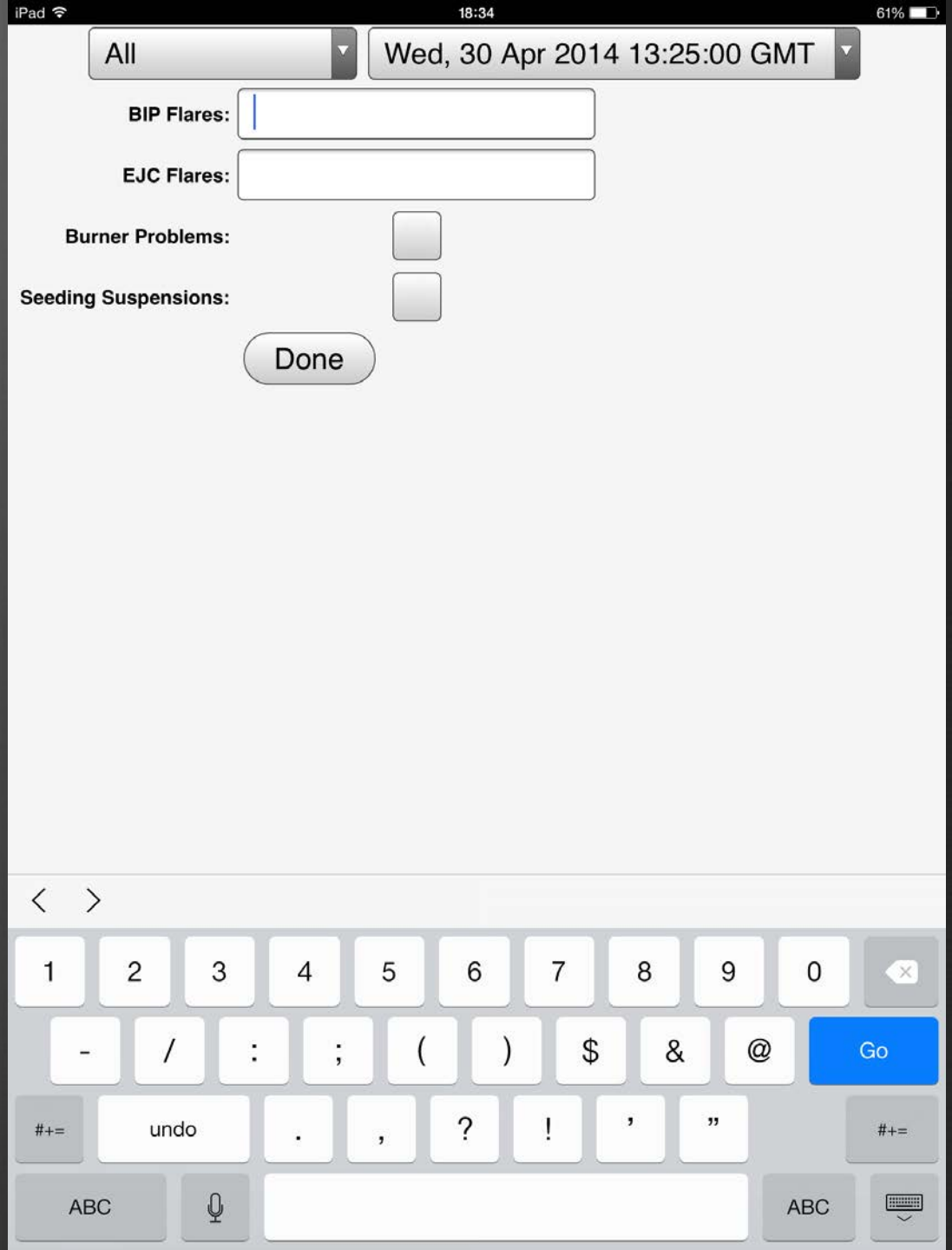
Select the appropriate flight from the list.

You can also sort flights.

After Flight

The first time you select a flight you will be prompted for BIP and EJC usage.

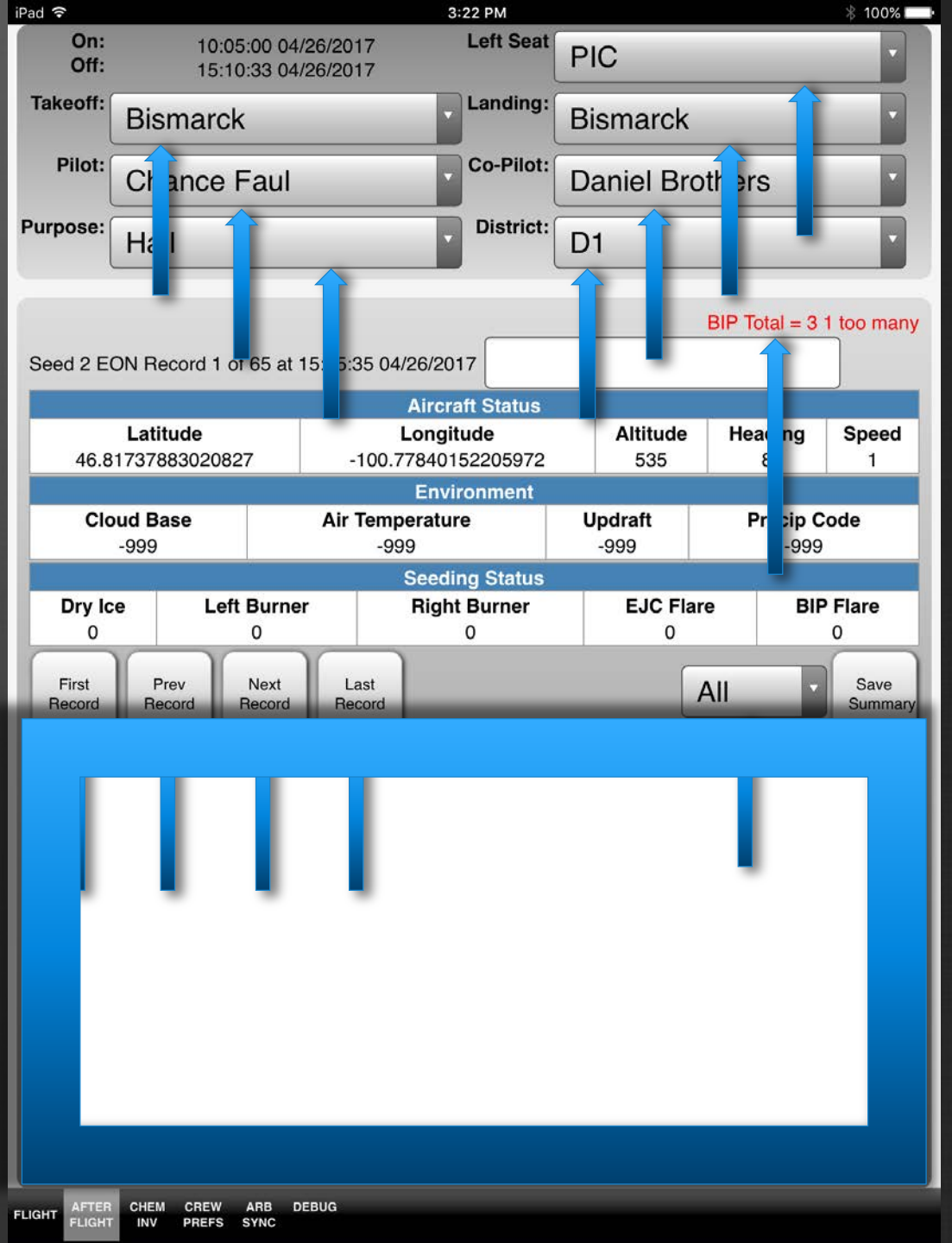
- These should be based on a VISUAL count of the number of flares ACTUALLY used during flight.
- If you get it wrong, you don't get a second chance. Get it right the first time.
- Check the appropriate box if you had burner problems or if seeding was suspended due to flash flooding or tornado warnings.



After Flight

If the number of flares used doesn't match the number of flares entered during flight the count turns red.

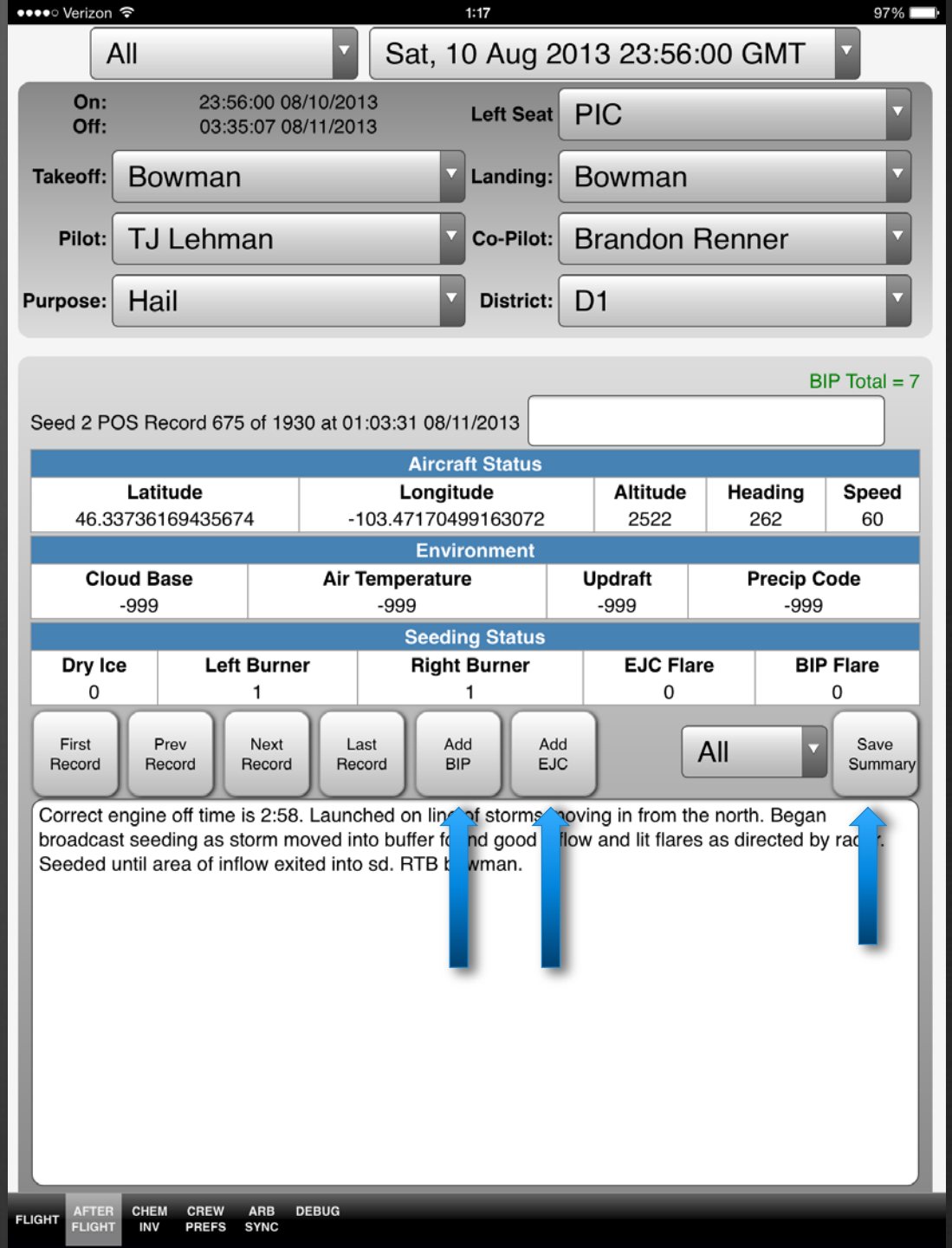
- You will need to fix this before syncing your flight.
- Various controls allow you to move between records.
- There are also menus for adjusting flight info if necessary.
- Enter a flight summary in the space provided.



After Flight

Moving through Records

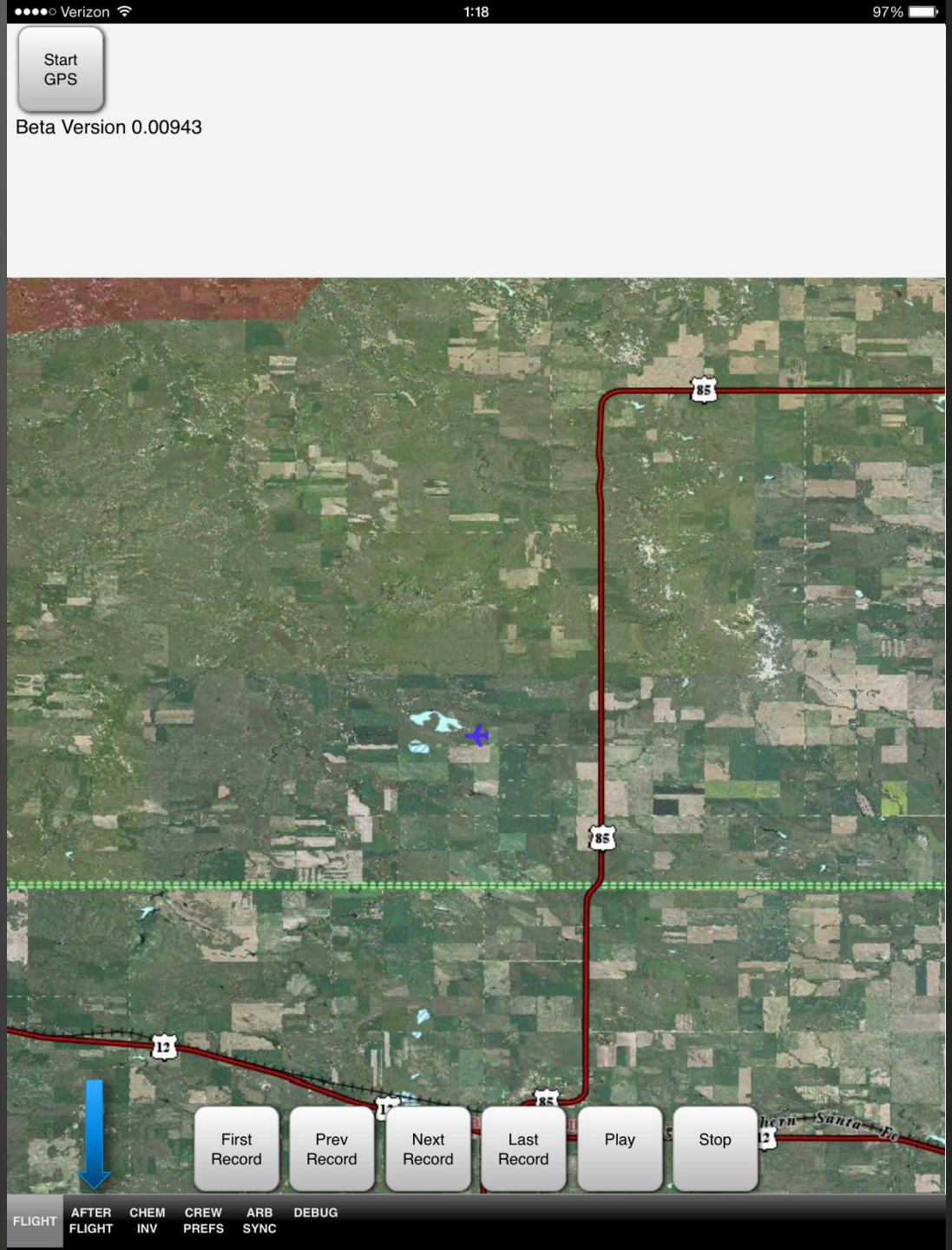
- You can sort records using the menu.
- Events include EON, EOF, BON, BOF, LON, LOF, RON, ROF, BIP, EJC, and ICE.
- You can Remove a Flare if you had an erroneous entry. (ex: A dud)
- You can add a flare if you forgot to hit the button during flight.
- Don't forget to Save Summary any time you make changes.



After Flight

Finding where to add a flare.

- The map can be helpful in finding where to add a flare, if you know about where it should have been.
- While in the flight records, press the FLIGHT button at the bottom of the screen.
- The map shows the planes position at the time of that record. Use the controls to go through the flight.
- Go back to AFTER FLIGHT and you'll be on the new record for editing.



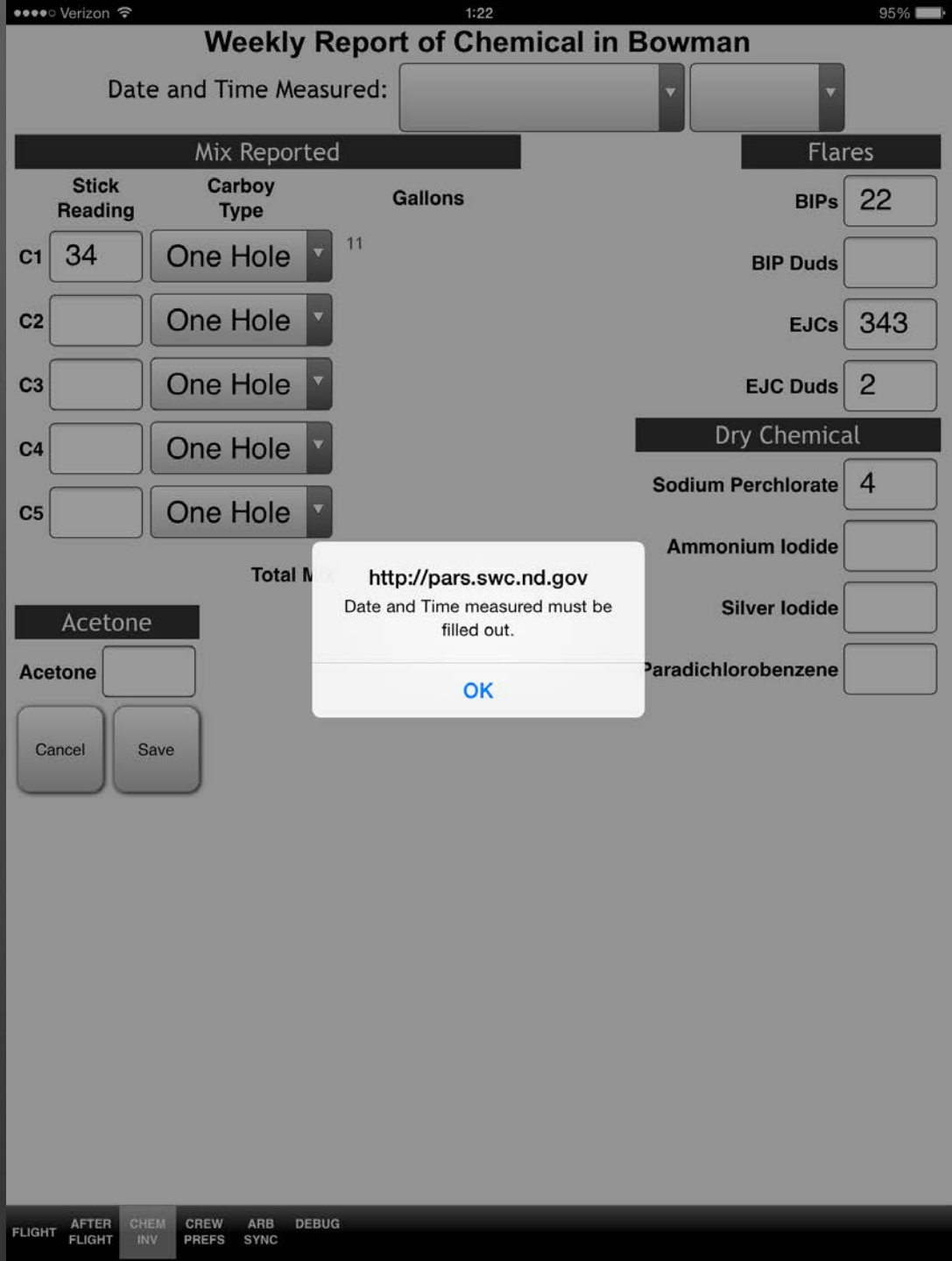
Weekly Report

Only for home site.

Weekly Chemical Inventories are completed every week before 17Z Monday morning.

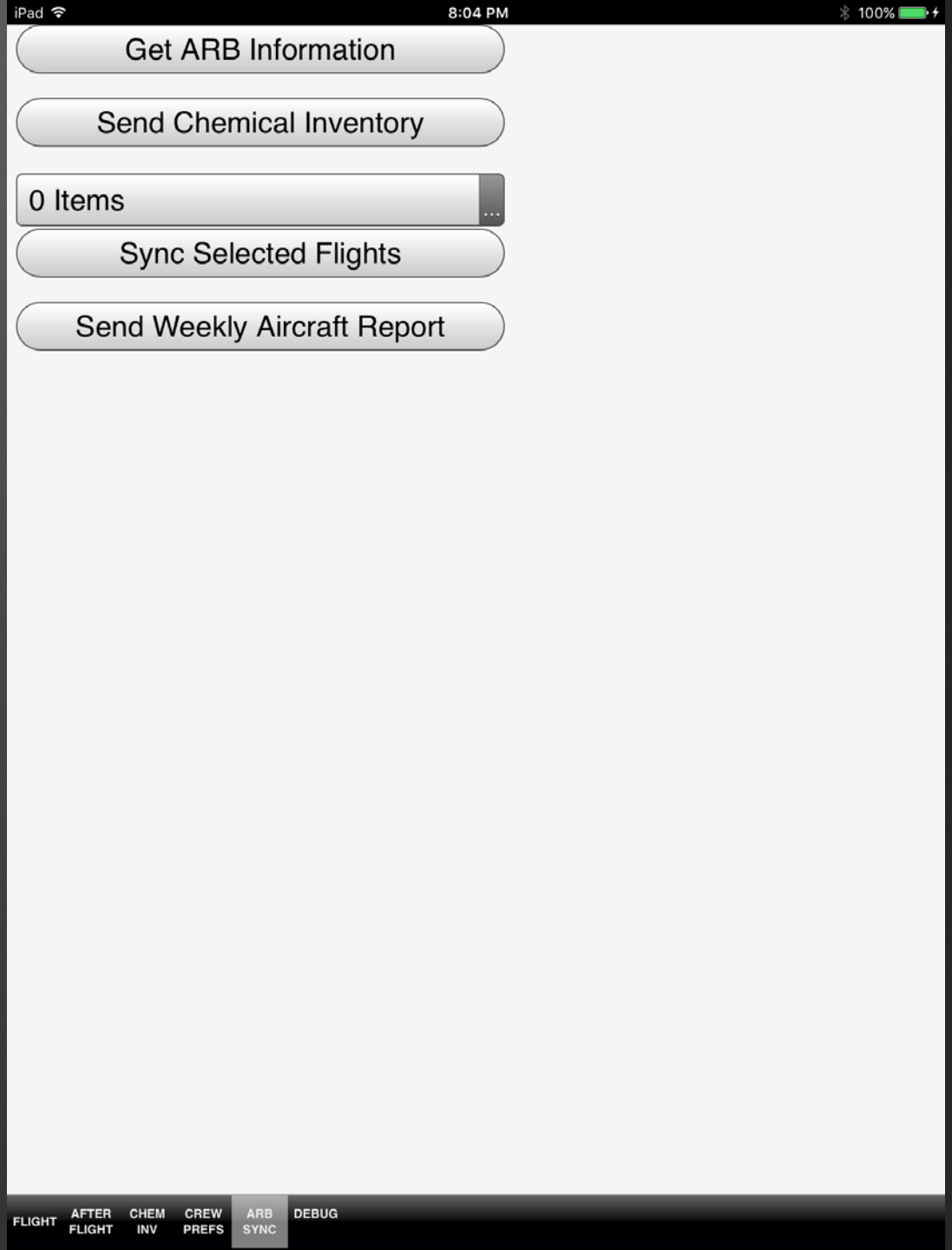
Make sure Date and Time are entered and accurate.

SAVE



ARB Sync

Send Chemical Inventory will send your weekly chemical to Bismarck.



ARB Sync

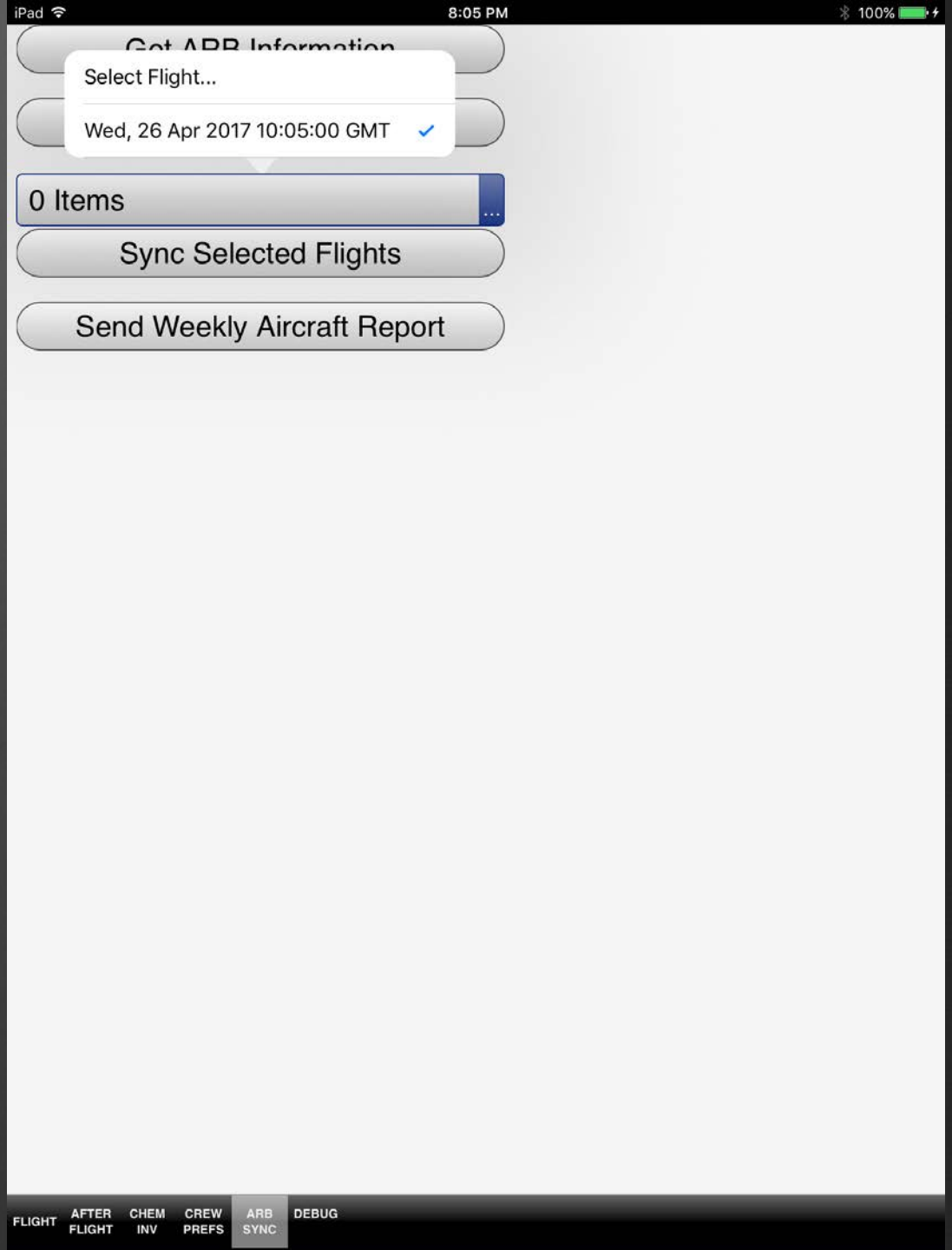
A menu shows any syncable flights.

Only select flights when you are ready to send them. (Summary is completed)

A flight is not syncable if you have not gone through After Flight yet.

A flight can not be resent unless a change is made. (Change Summary if needed)

Sync Selected Flights (May take a few minutes)



ARB Sync

SEND WEEKLY FLIGHT REPORT

-Used to report the number and type of flights during the week.

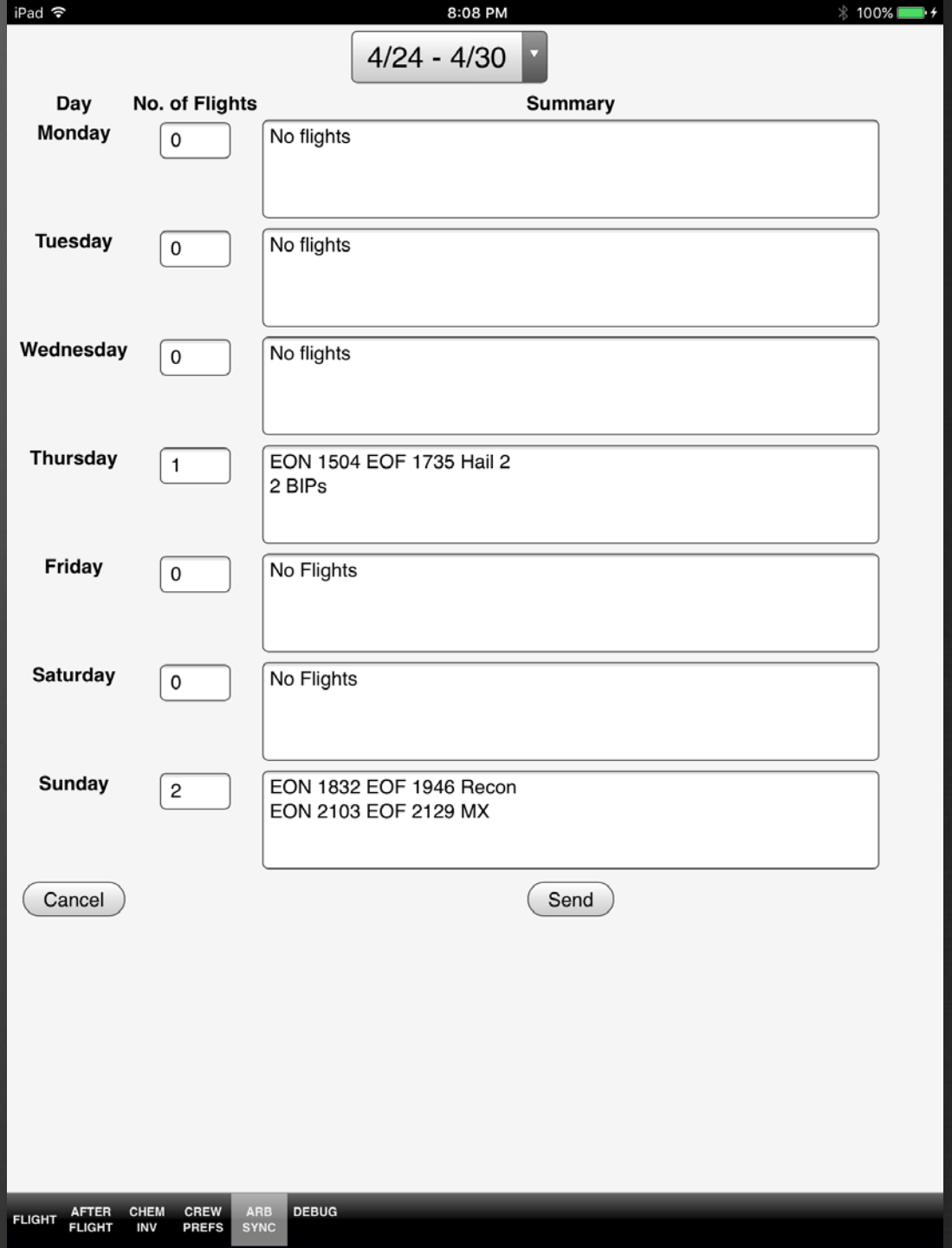
-Make sure the proper week is selected.

-Enter the total number of flights for each day, based on UTC, regardless of purpose.

-If flights occurred, list the EON, EOF, and purpose of each flight.

-List # and type of flares used, if applicable.

-Push Send. You will be automatically returned to the ARB Sync page.



Questions?