STS-107 Accident Investigation Ground Track, Events Summary, and Sighting Data Based on the Rev 15 Master Time Line

(Baselined, 03/10/03, 08:00 pm)

and Sighting Data Catalogued by the JSC Emergency Operations Center

March 17, 2003

Explanation of Ground Track & Events Summary

- GPS Ground Track Data Source: STS-107 GPS State Vector

- Event Time Line Source: STS-107 Accident Investigation Master Timeline (Baselined), Revision 15, dated 03/10/03 08:00 pm CST, from the Integrated Time Line Team.

- GPS-derived Latitudes and Longitudes are plotted on the map at 0.96 second time intervals, although there are numerous data dropouts. The symbol used for points from the trajectory data file is a red dot. Thirty-two seconds of down list data have been recovered from the post-Loss-of-Signal period, including some GPS data. The five data points from this period are indicated by turquoise dots.

- The time tags of events from the Master Time Line sometimes fall between trajectory data points, and in some cases they occur during GPS data dropouts. In these cases the location of the event is indicated by a blue dot.

- Explanation of the contents of Event Note Boxes:

    - Grey Header – Greenwich Mean Time (GMT) of the event and the Event Sequence Number from the Master Time Line (in parentheses)

    - Geodetic Latitude and W. Longitude of the event (red dots only) in decimal degrees.

    - Event description and remarks from the Master Time Line (augmented by text boxes as required)

    - Geodetic Altitude (H, ft) & Mach Number (Mach), interpolated when necessary

    - Some nominal events have been intentionally omitted.

Explanation of Ground Track & Events Summary (continued)

• For events that cover a range of times, or have a range of uncertainty greater than one second in the time tag, the time in the header is the center of the time span, followed by the comment "Center" in parentheses. For example, the time in the header for event 100 is shown as "14:00:04 GMT (Center)." The entire range of times is given in the note box text just before the event description. This is a change from previous versions of the ground track/time line maps, which put the earliest time in the note box header.

• Post Loss-Of-Signal Ground Track Data Source: The Descent Analysis Group (DM42) produced a ballistic trajectory for a hypothetical object with a Ballistic Number of 220.0 lb/ft^2. This trajectory was propagated from 13:59:37.00 GMT to ground impact at 14:03:34 GMT in Louisiana. One second time steps are shown. The symbol used for post-LOS trajectory data is a yellow dot. An update to the reference trajectory is pending.

The hypothetical post-LOS ground track is used here as a reference to locate post-LOS time line events and visual sighting data on the map background. It must be emphasized that the post-LOS ground track is provided as a reasonable visual reference only, and does not represent the actual trajectory of any known piece of the vehicle.

Explanation of Ground Observer Sighting Data

• The location of a ground observer is indicated by a turquoise triangle. ▲

• Sighting location note box headers contain the NASA sighting number and the observing site name.

• Sighting note boxes also contain the Latitude and Western Longitude of the observer, and Acquisition-Of-Sighting (AOS) and Loss-Of-Sighting (LOS) times (GMT). AOS and LOS times do not represent horizon break, but are the actual beginning and ending times of the observer's video coverage.

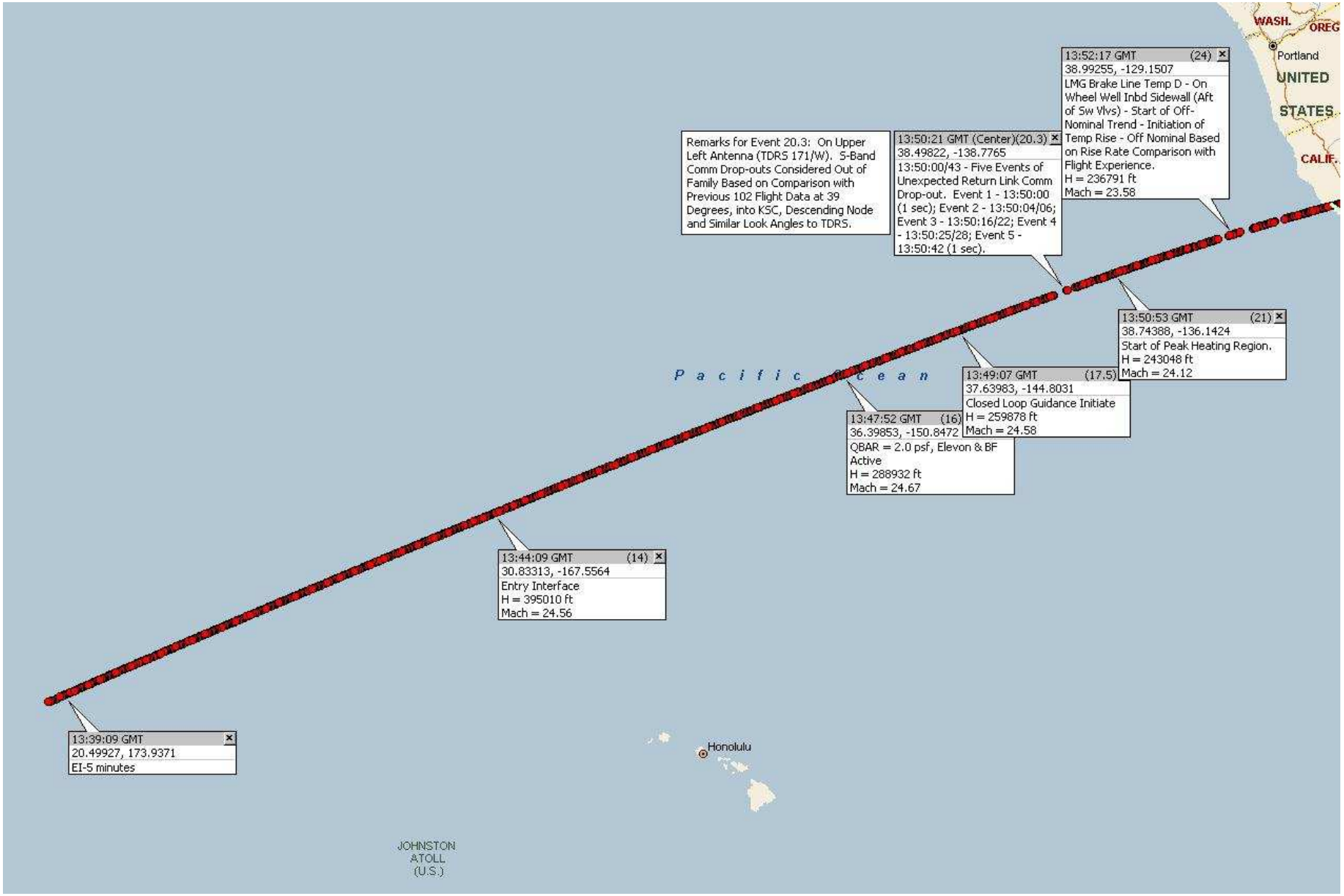
• For each sighting, the period of observation is indicated on the map by a colored region bounded by the lines-of-sight from the observer to the ground track at AOS and LOS.

• When colored regions overlap, one color overlays the other, but the AOS or LOS line-of-sight of the underlying region is indicated by a thick line of the underlying color.

• In selected cases AOS or LOS points associated with specific sightings are labeled using note boxes. This is done for clarity when needed, usually if the sighting location does not appear on the same map with its AOS or LOS point.

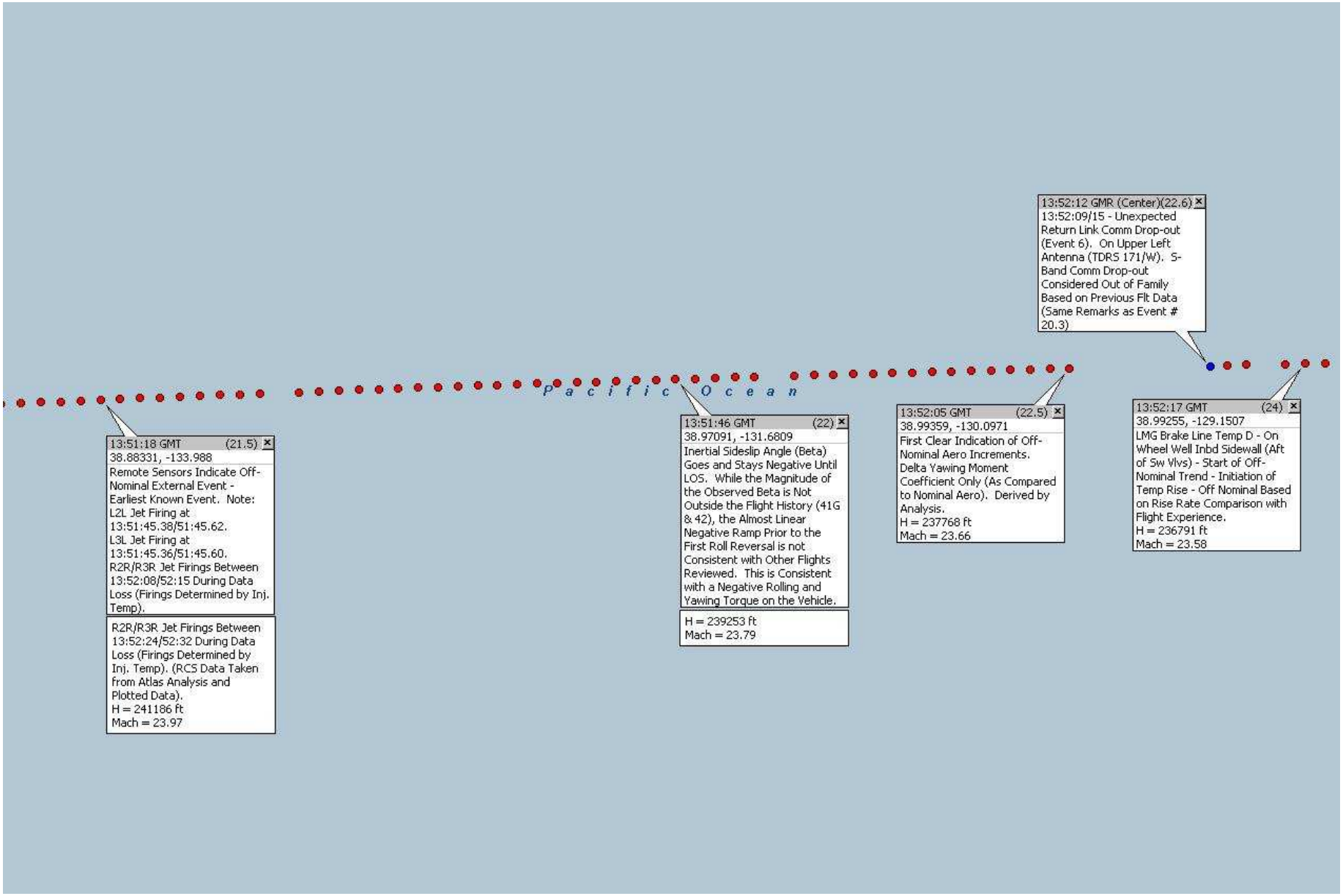
• The post-LOS maps show the locations of four sightings that occurred after Loss-Of-Signal with the vehicle, when no GPS ground track data were available. Sighting lines-of-sight are shown with respect to the hypothetical reference post-LOS ground track (yellow dots).

Entry Interface to Coastal Crossing



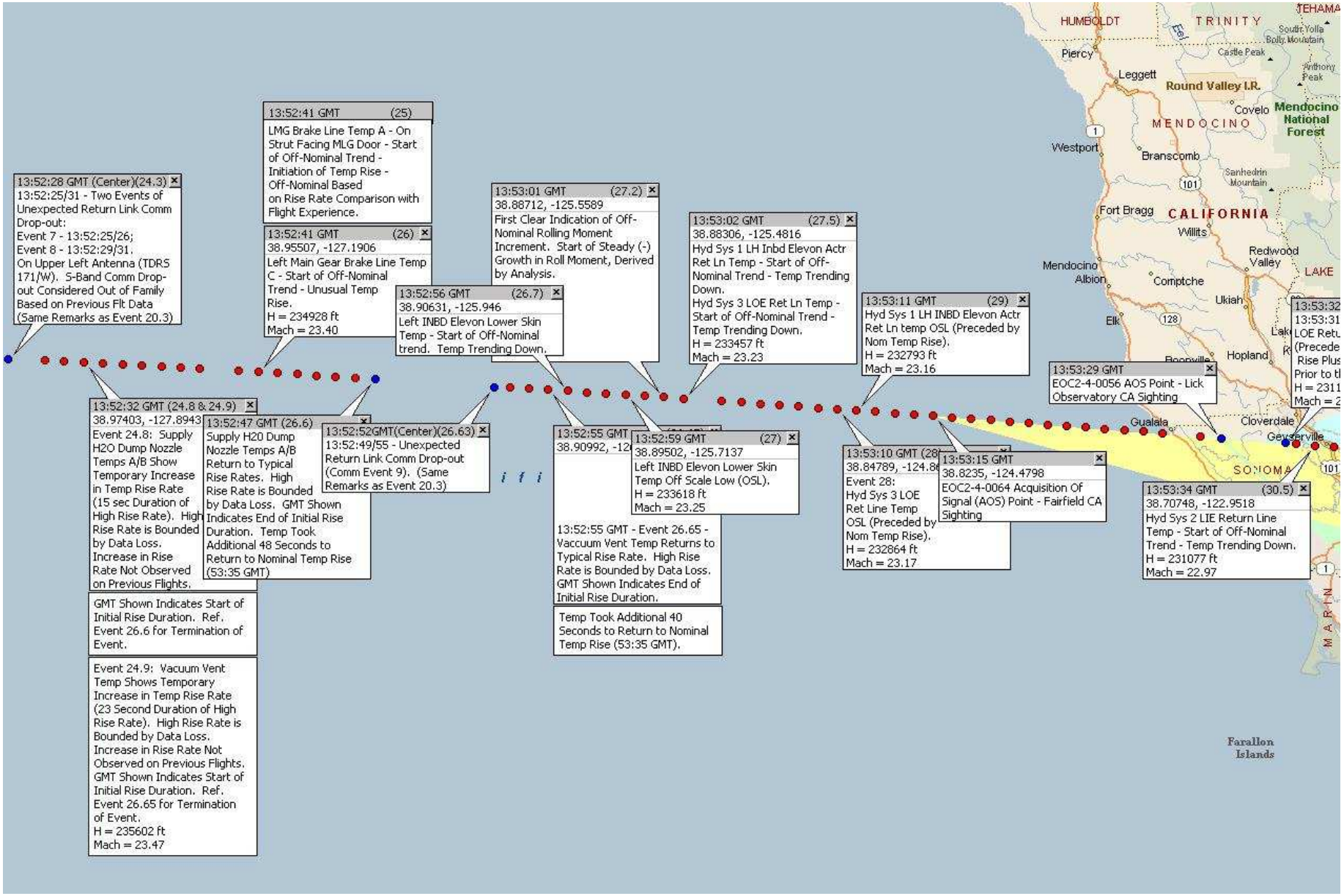
Based on Master Time Line Rev 15, 03/10/03

Approaching the Coast



Based on Master Time Line Rev 15, 03/10/03

Crossing the California Coast



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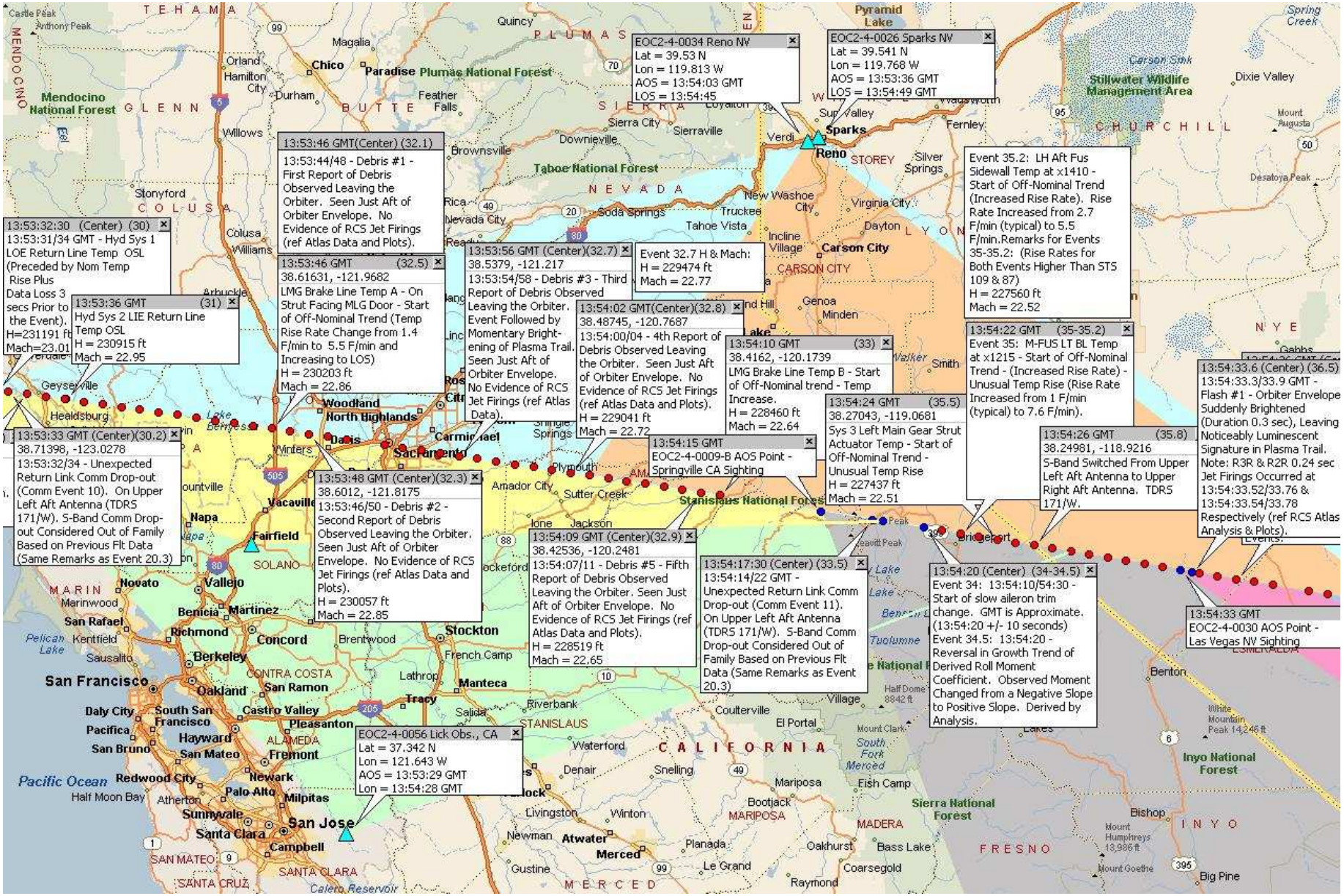
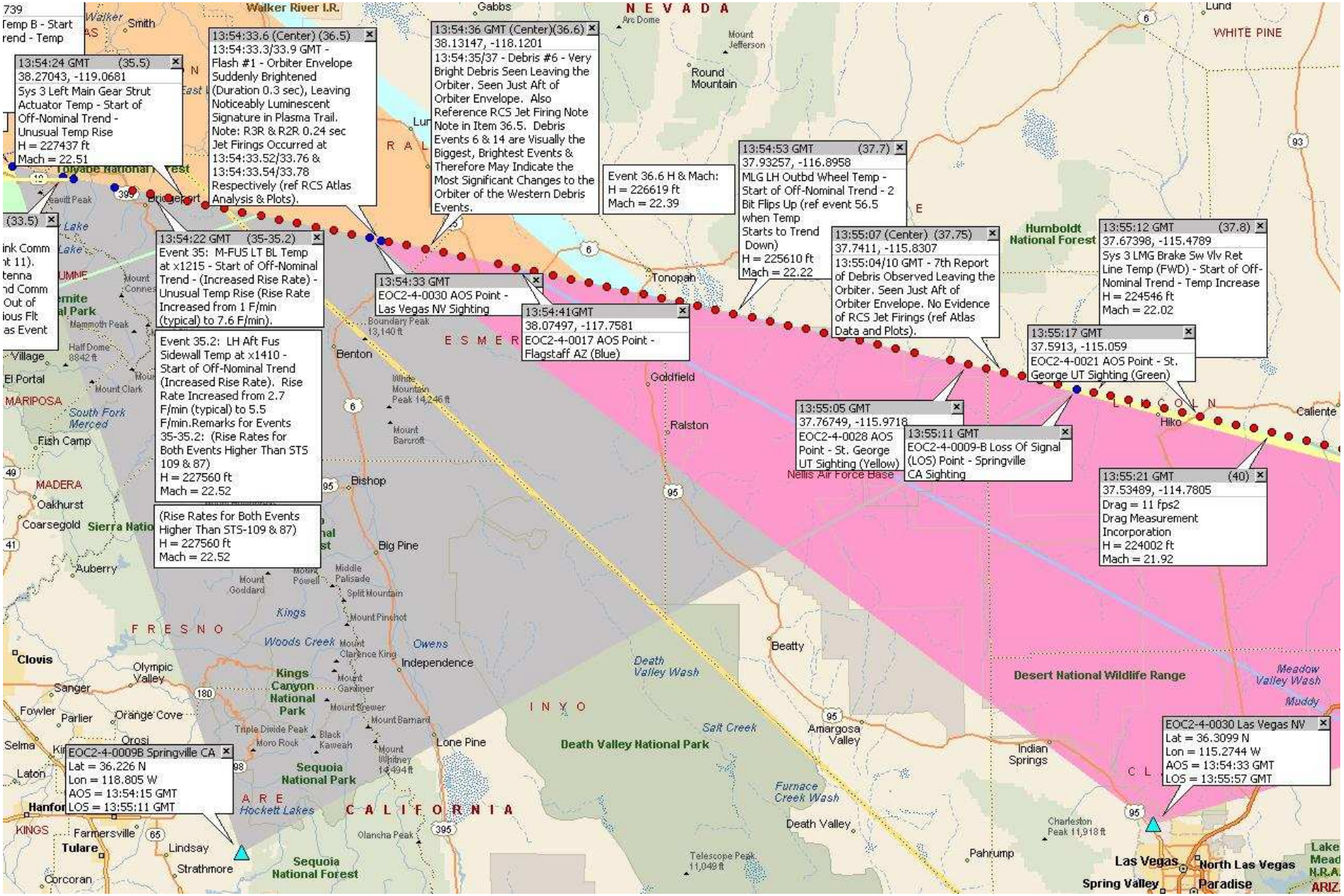
Crossing California



Crossing from California to Nevada



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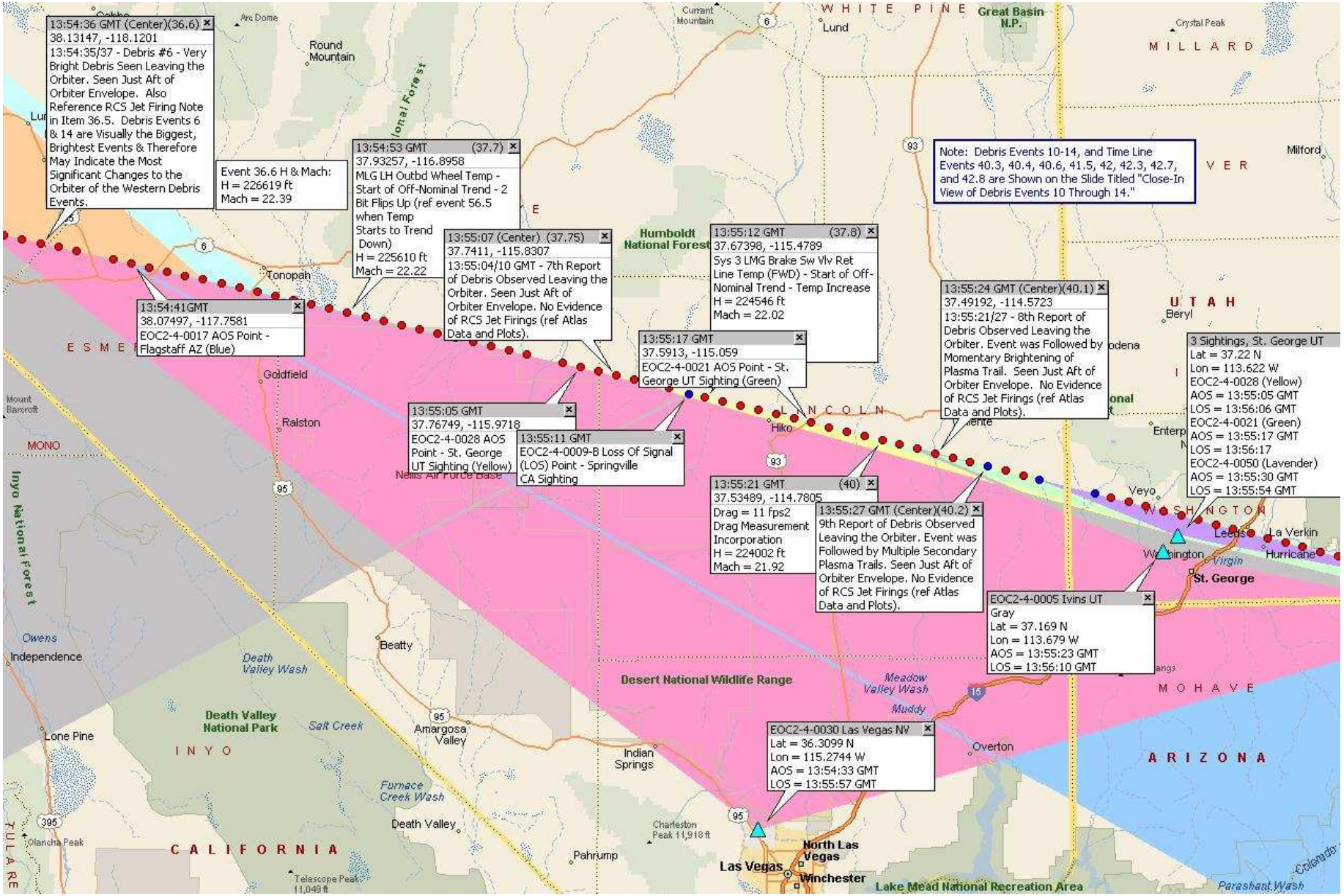
Crossing Nevada and Utah



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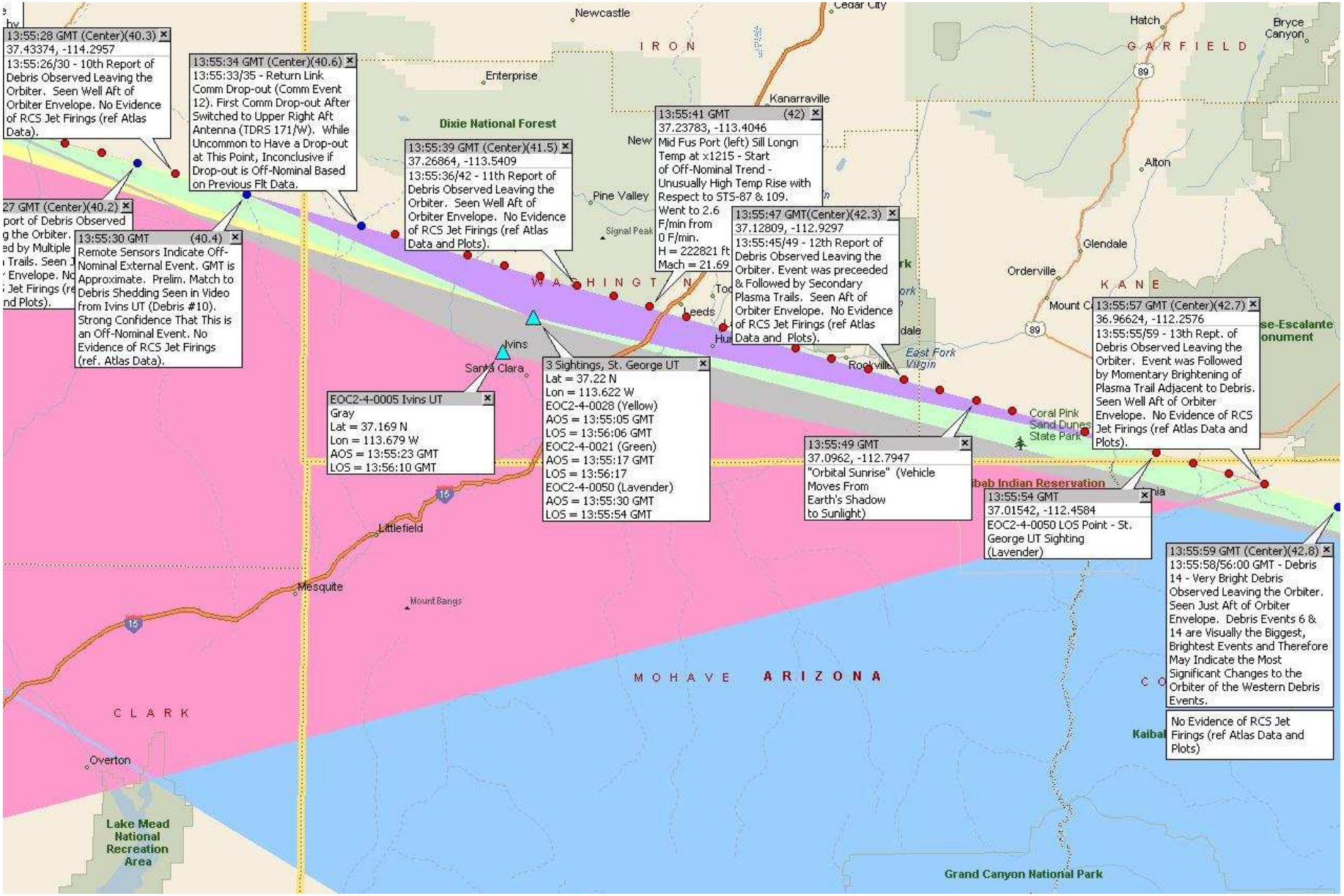
Close-In View of Debris Sightings 10 Through 14



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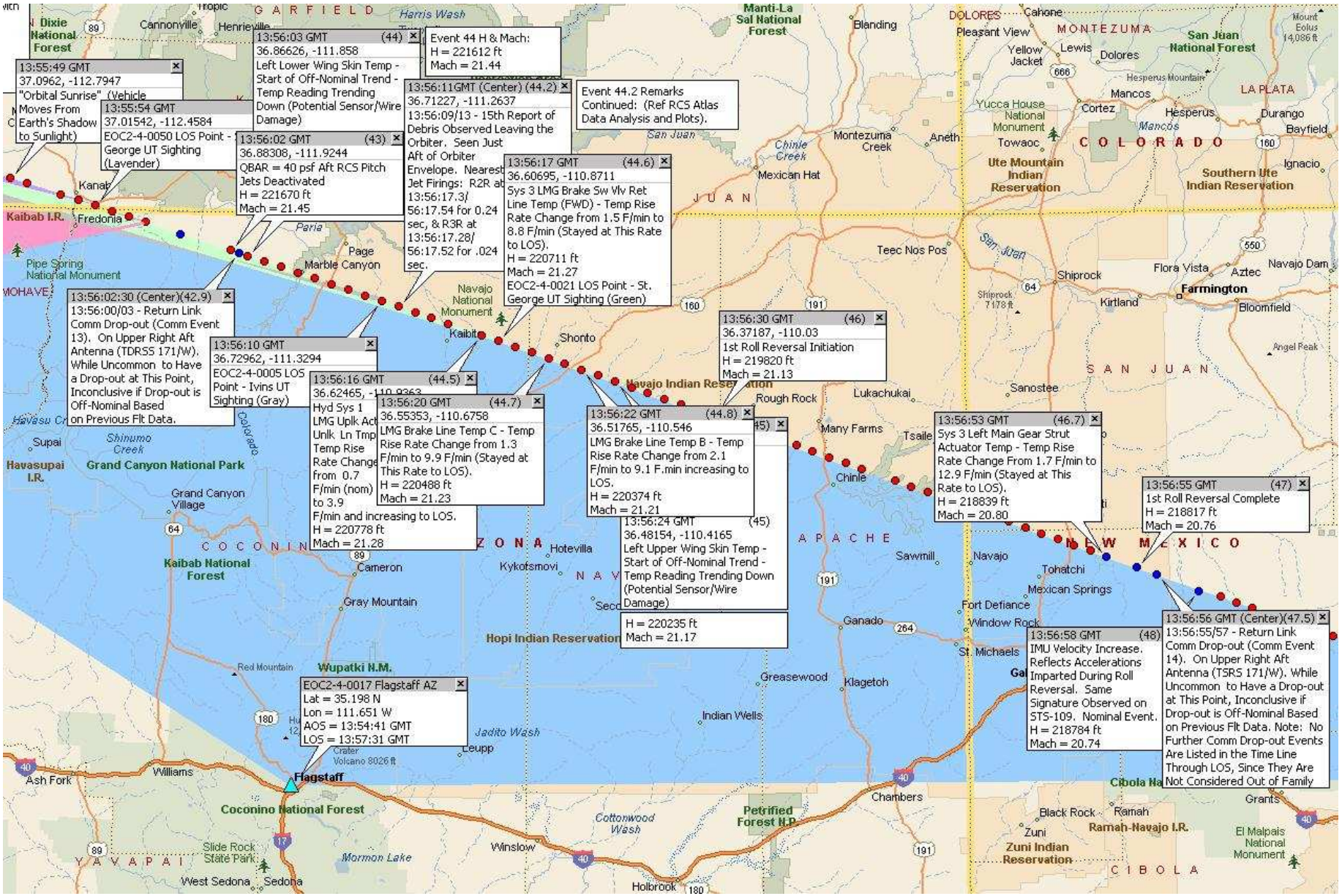
Crossing Arizona



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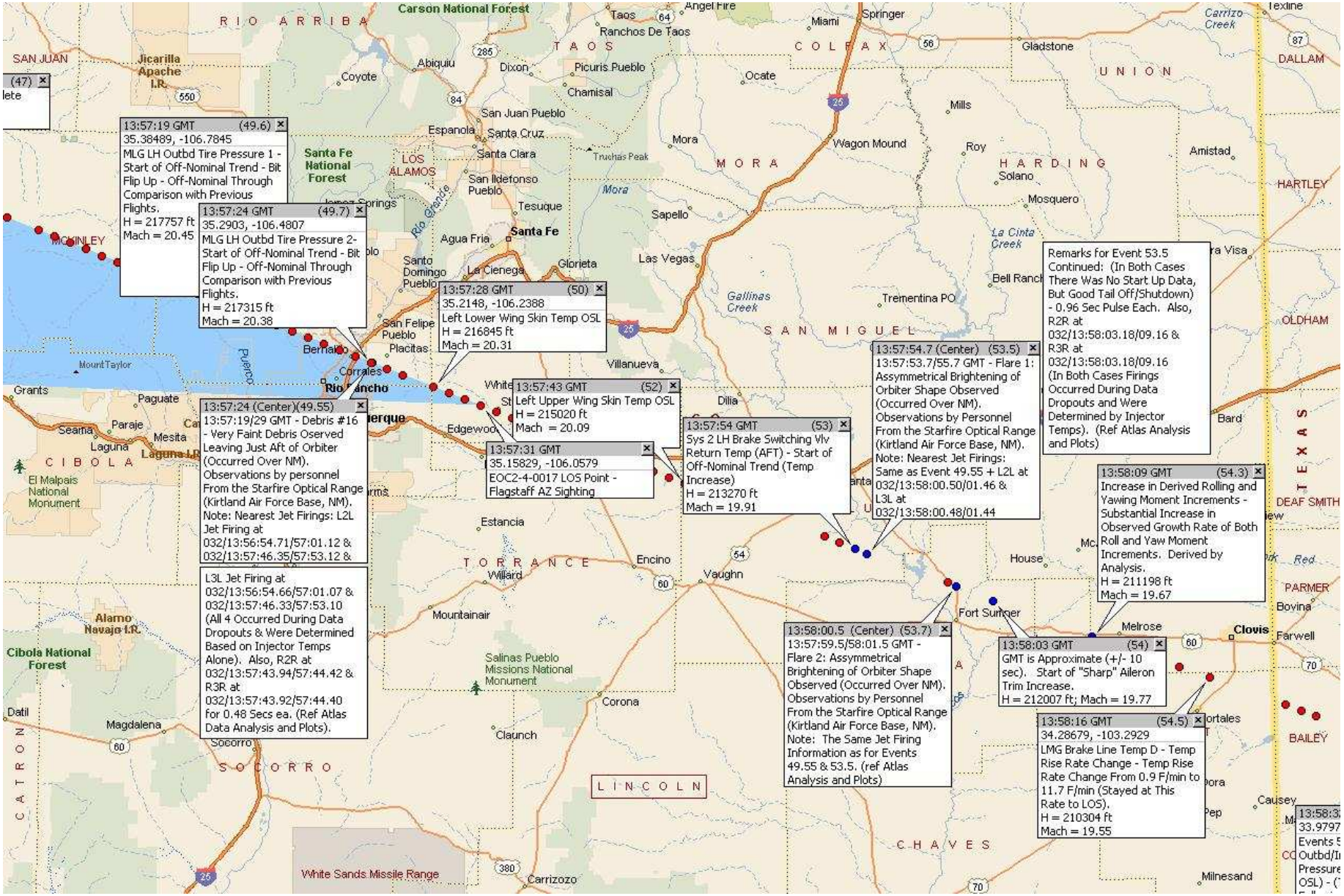
Crossing New Mexico



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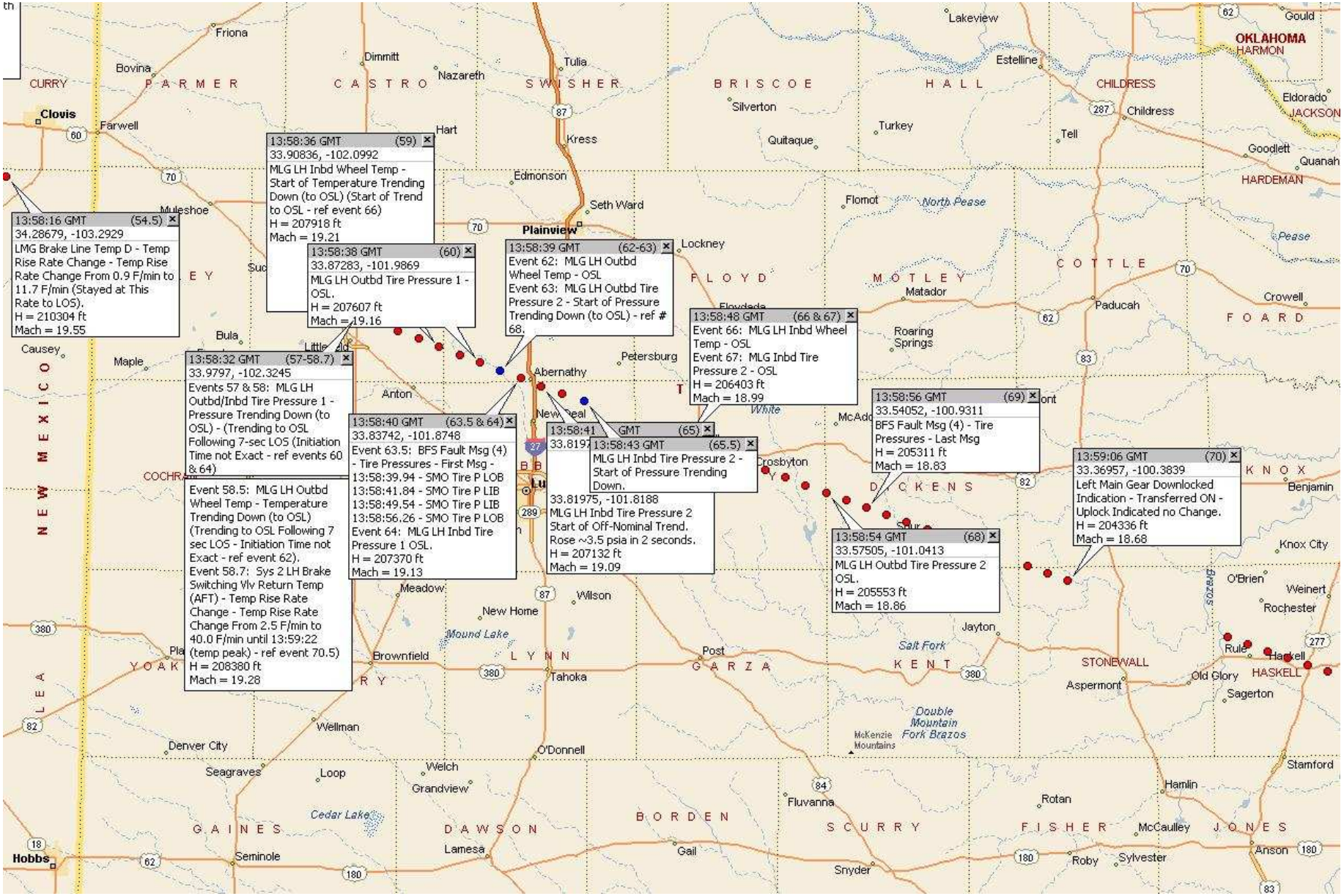
Crossing North Texas



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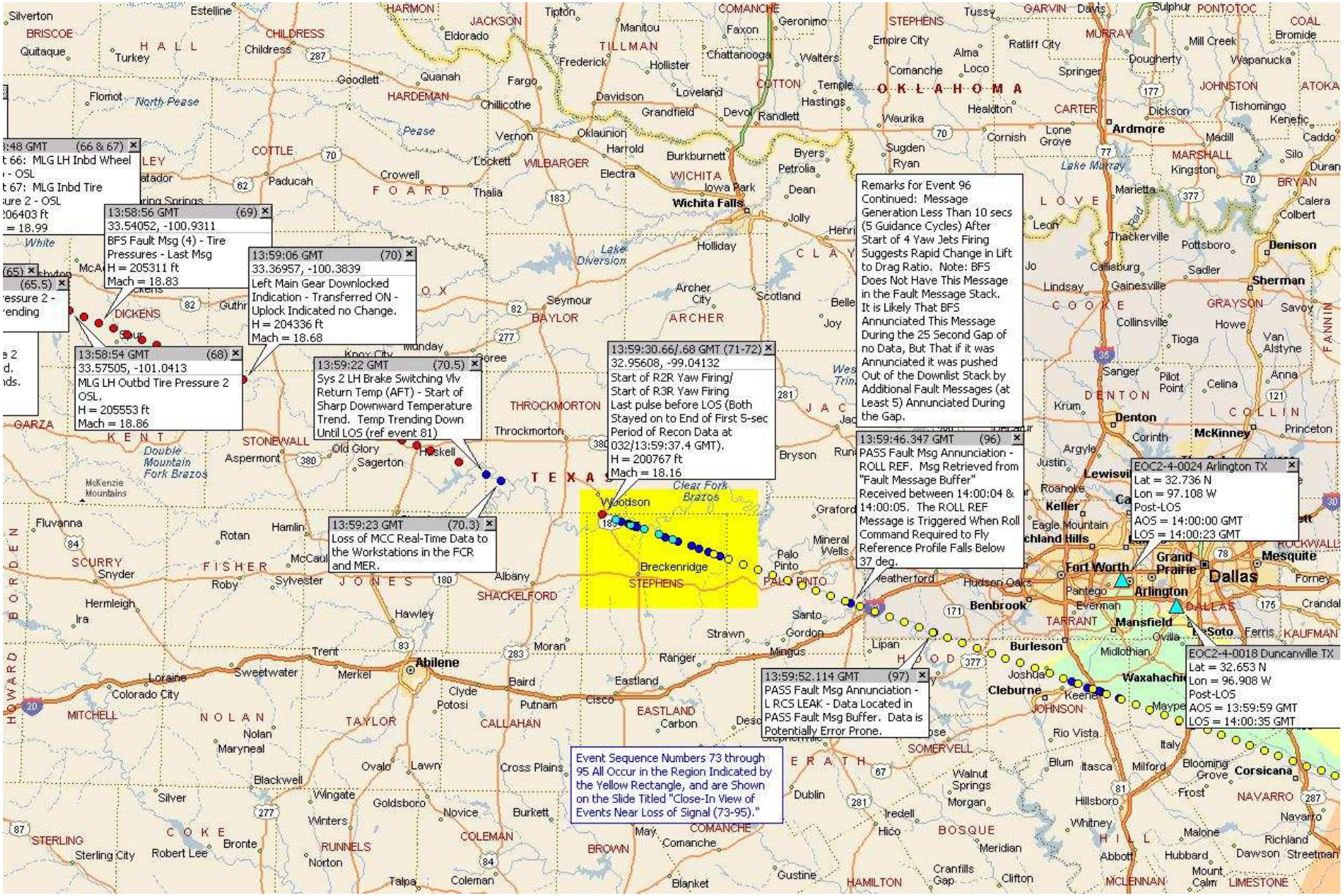
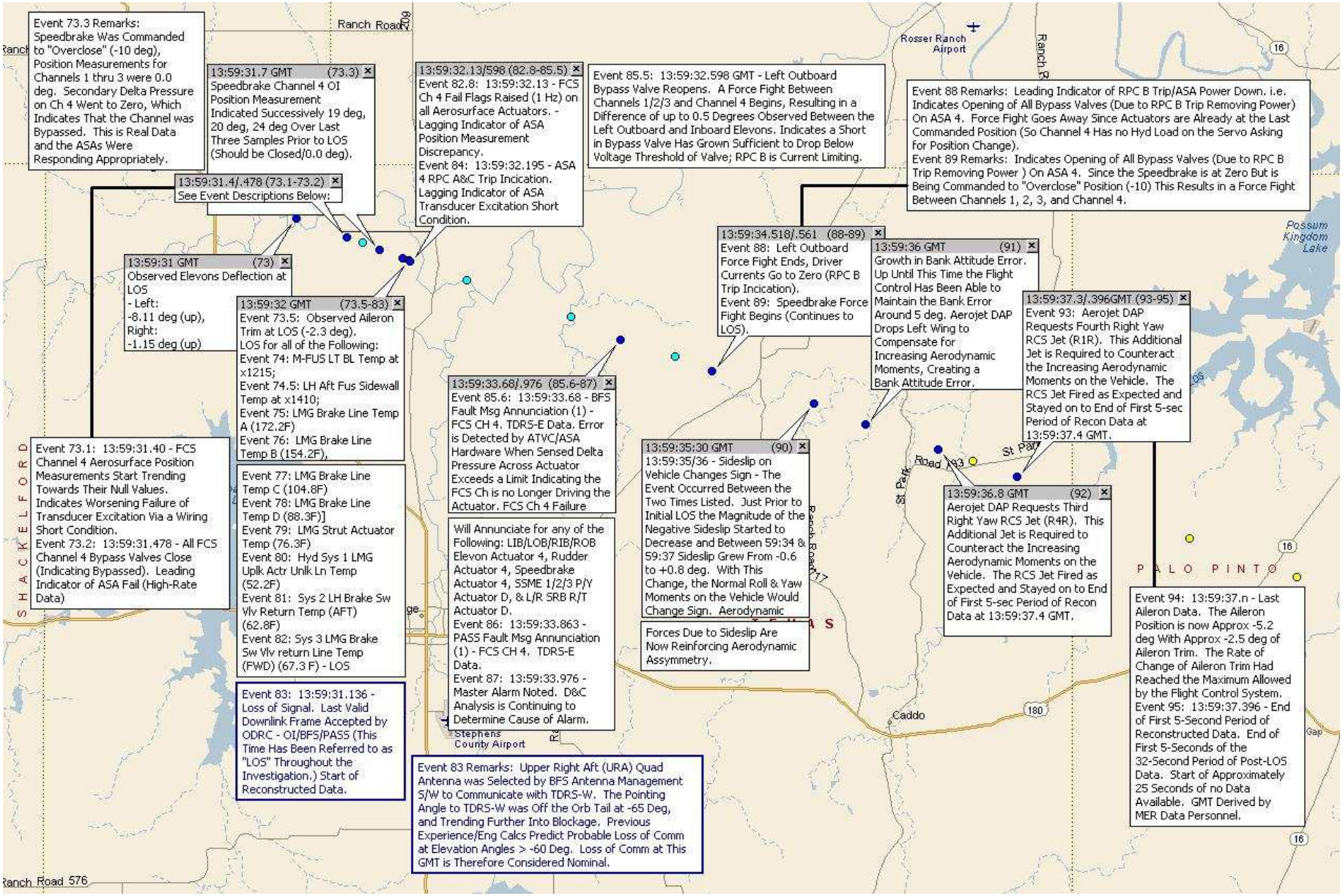
Crossing Texas to Loss of Signal



Based on Master Time Line Rev 15, 03/10/03

Close-In View of Events Near Loss of Signal (73-95)



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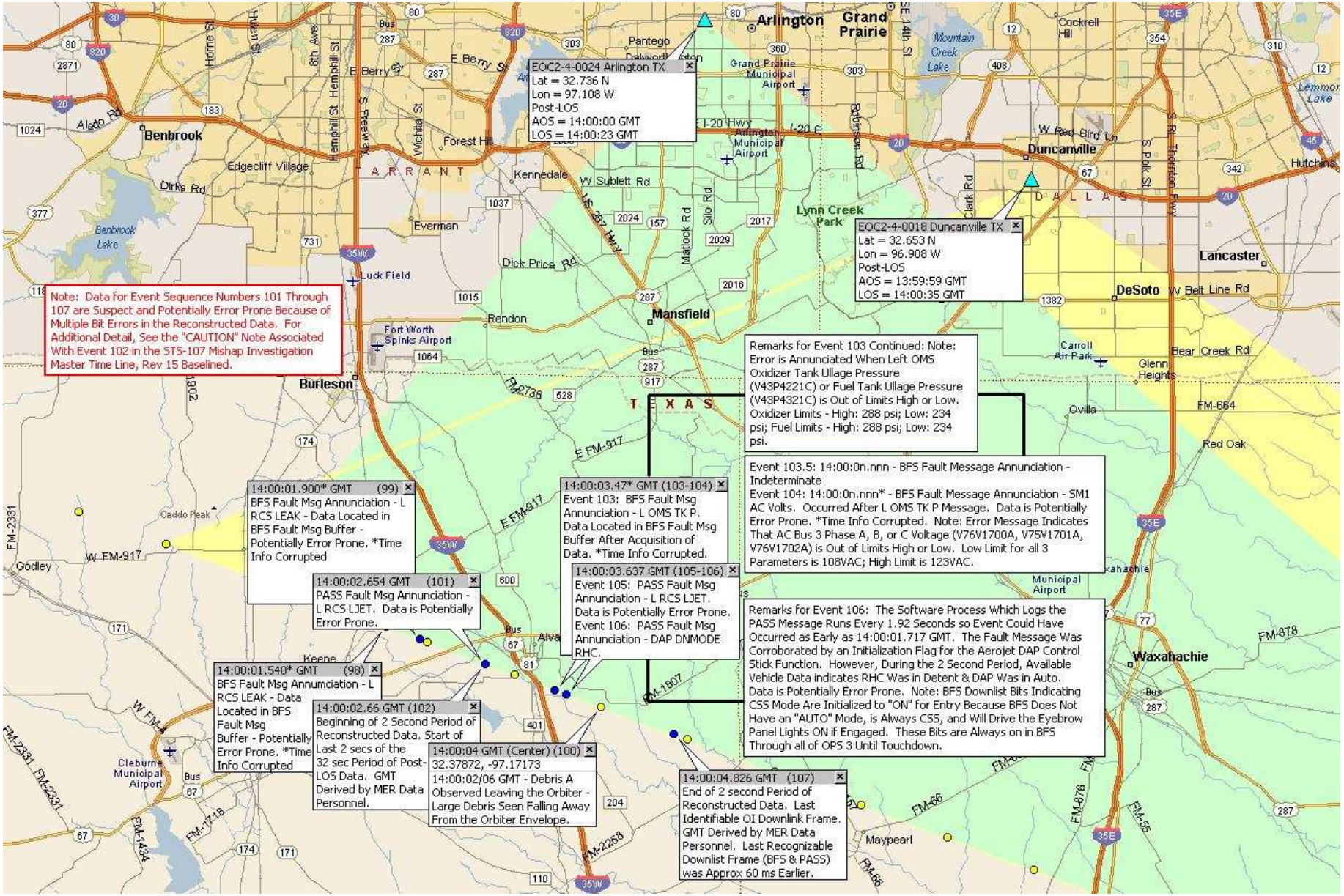
Close-In View of Post-LOS Events (98-107) – Reference Trajectory



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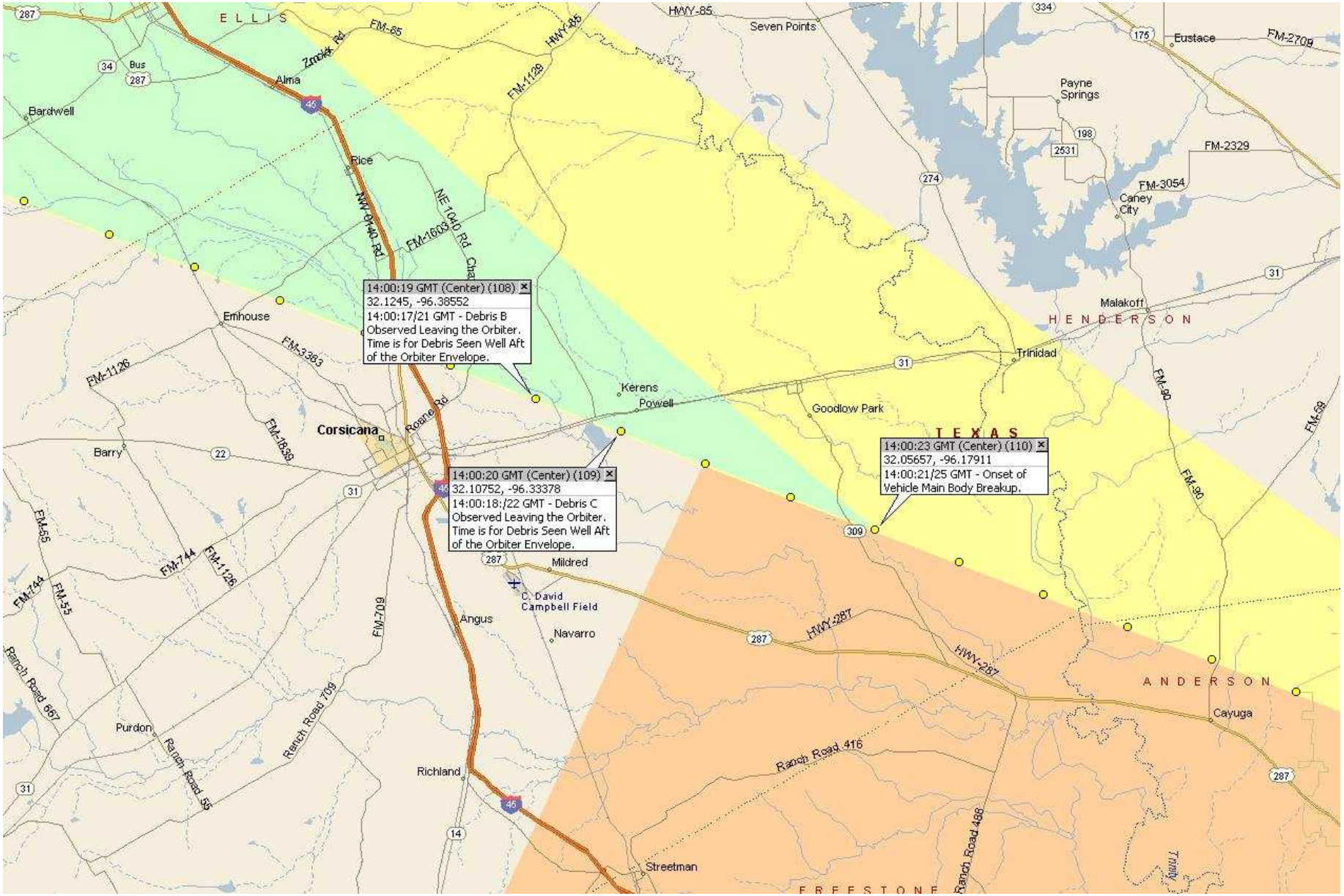
Close-In View of Post-LOS Events (108-110) - Reference Trajectory



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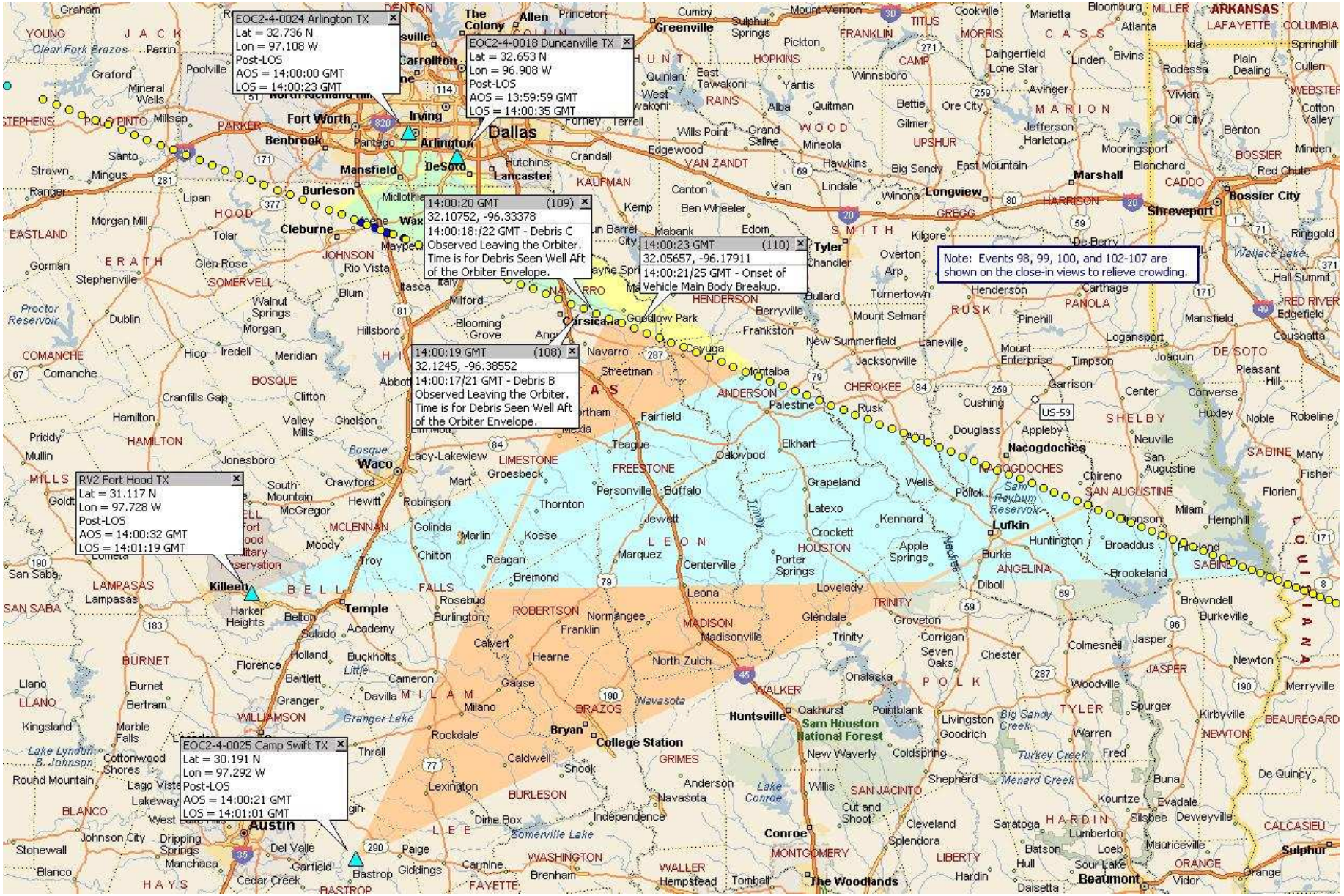
Post-Loss of Signal Sightings - Reference Trajectory



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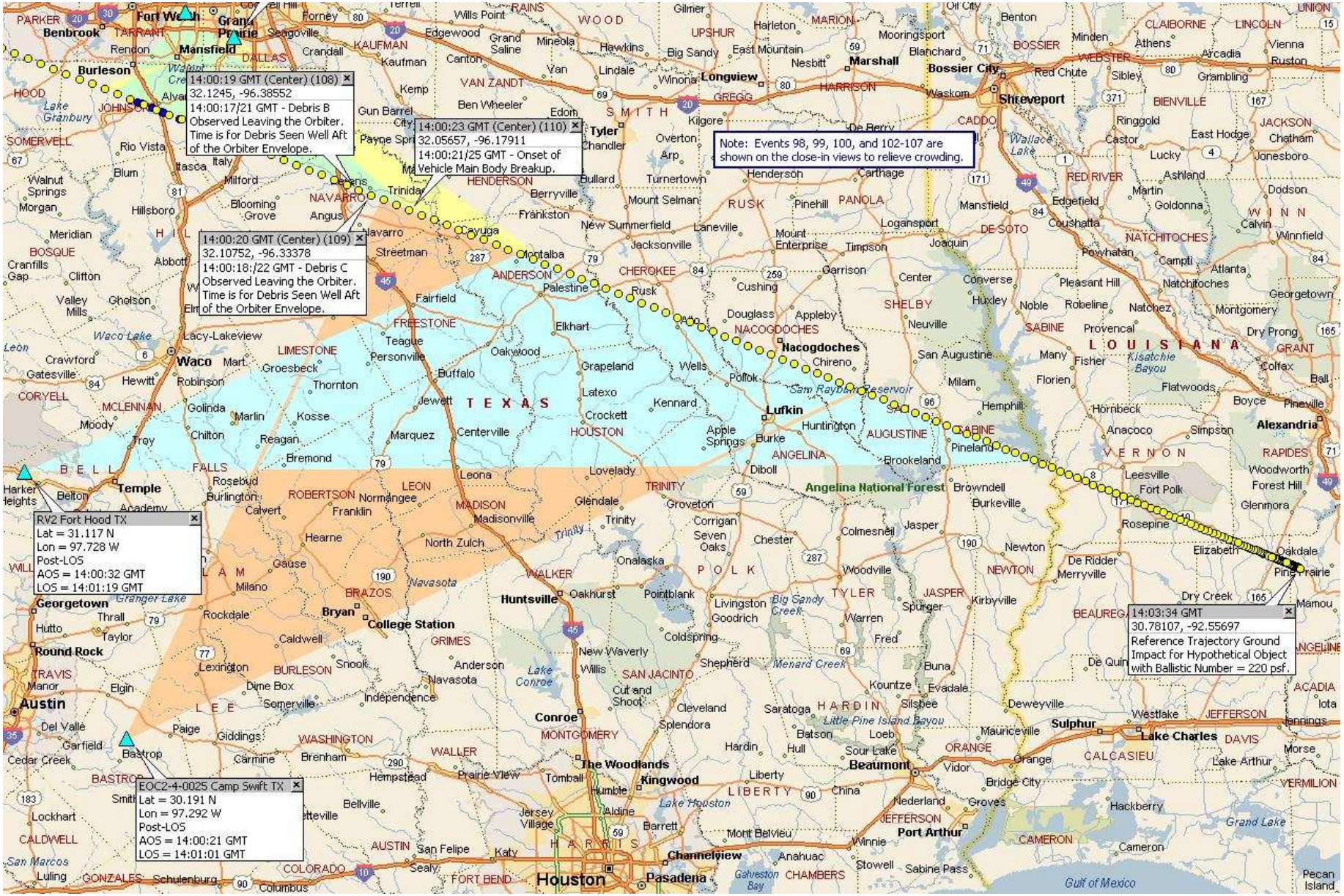
Reference Trajectory from Texas to Louisiana



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