

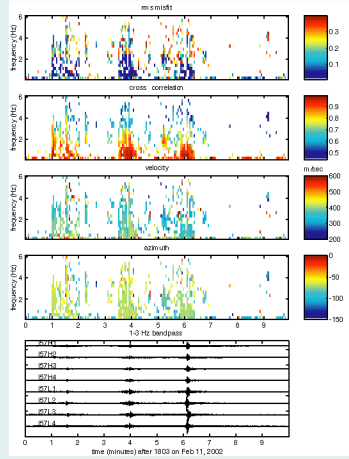
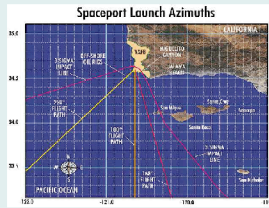


Analysis of Infrasound Sources Detected by the I57US array



V. Delta II Rocket launch

A Delta II rocket was launched at 17:43:44UT on Feb 11, 2002 (time from www.schnapp.org/sky/sky_recent.html). The background noise was much lower than average for this launch so the acoustic arrival structure can be analyzed in detail. The image at right, from the information page at Spaceport Systems International (www.calspace.com/informat.htm) shows feasible launch angles from Vandenberg airforce base. Most launch azimuths range from 168 - 200 degrees, and do not pass over populated areas. However, any angle between 150-270 degrees is a feasible launch angle.



The zero time for these plots is 18:03, over 19 minutes after the launch. As for the signals identified in an earlier analysis of rockets launched at Vandenberg (D'Spain *et al.*, 2002), the waveforms are dominated by three phases at an azimuth consistent with a source at VAFB, with arrival times at 20.5min, 23.5min, and 25 min after the launch. In the D'Spain *et al.* paper the first 2 arrivals were modeled as stratospheric-refracted arrivals, and the third was identified as an initial reflection from the ground, followed by a refraction from the thermosphere. Another phase is identified here, with a frequency range of 1-3 Hz (at about 18:08.2). It has a back azimuth consistent with a source further to the south. It may thus represent an arrival from a later point on the rocket's trajectory.

Conclusions

The large majority of signals detected by the I57US array in southern California remain unidentified.

We are developing a version of our PMCC code to automatically detect and characterize acoustic signals recorded by this array. The result of this survey will be a catalog of all significant sources detected since April, 2001. This work is being done in conjunction with a survey of sources within 1000 km of the array that are known to generate infrasonic signals.

Once the survey is complete, a subset representing a broad suite of event types will be analyzed in greater detail by modeling the atmosphere at the time of the event, collecting detailed ground-truth data describing the event.

References

Cansi, Y., 1995, An automatic seismic event processing for detection and location: The P.M.C.C. method, *Geop. Res. Lett.*, 22, p1021-1024.
D'Spain, G., M. Hedlin, J. Orcutt, B. Kuperman, C. de Groot-Hedlin, L. Berger, and G. Rovner, Application of physics-based underwater acoustic signal and array-processing techniques to infrasound source localization, 24th Seismic Research review, p735-744, 2002.
Le Pichon, A., and Cansi, Y., 2003, PMCC for infrasound data processing, *Inframatics*, 1, 1-9.