

August 2002

**TRIP REPORT**  
**JOEL PENTEADO'S AERIAL SKETCHMAP TRAINING IN THE USA**  
August 18 - 24, 2002

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## INTRODUCTION

During the period of August 18 - 24, 2002, Joel Penteado traveled from southern Brazil to the United States where he received aerial sketchmapping training from USDA Forest Service aerial survey specialists.

This training provided Joel with aerial sketchmapping skills needed for detecting and mapping damage caused by forest insects, disease and other factors affecting forest health. Joel's training is part of an ongoing USDA Forest Service technical exchange agreement with the Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA), the Brazilian Agricultural Research Institute. This agreement was put in place to provide management of the European wood wasp, *Sirex noctilio*, an insect native to Europe that has been introduced into several countries in the southern hemisphere, including Brazil. The European wood wasp is a serious economic pest of southern Brazil's pine plantations. If the wood wasp were ever to become established in the United States, it would most certainly cause serious losses here as well.

In February of 2001, William Ciesla and Erik Johnson traveled to southern Brazil for an aerial survey feasibility study and concluded that aerial sketchmapping, as a forest damage assessment tool in Brazil, would indeed be possible (Ciesla and Johnson 2001). A year later, in April of 2002, Ciesla and Johnson returned to Brazil where they taught aerial survey to Joel and eleven students over the course of a two-week period (Ciesla and Johnson 2002). By the end of the training, it was obvious that Joel was the student most likely to become EMBRAPA's aerial sketchmapping specialist. It was subsequently suggested that Joel spend a week in the USA observing an operational aerial sketchmapping mission and further his sketchmapper training.

During this training session, the following activities were undertaken:

1. Training flights in aerial sketchmap techniques.
2. Demonstration flights using a new state-of-art sketchmapping tool, the Digital Aerial Sketchmapping (D-ASM) system (see Figure 1).



**Figure 1. Two laptop computers interfaced with a Global Positioning System (GPS) unit as part of the Digital Aerial Sketchmapping (D-ASM) system used during the 2002 aerial survey of the Black Hills of South Dakota and Wyoming. Note the Landsat 7 imagery displayed on the touchscreens, which was used as the map base.**

### TRAINING SESSION

Training was conducted during the period August 19-23, 2002 in the Black Hills of western South Dakota and northeastern Wyoming. The following lists some of the week's highlights:

1. Joel participated in six separate aerial survey flights logging over 17 hours of flight time. This does not include ferry flights to and from Rapid City, SD from the Jefferson County Airport in Broomfield, CO.
2. The aircraft used for these flights was a Cessna P210 (pressurized cab with retractable landing gear) based out of Liberal, KS and owned by the Lyddon Aero Company. The pilot was Paul Blasser who provided us with exceptional piloting skills.



**Figure 2. From left to right: Lowell Lewis, Erik Johnson, Joel Penteadó, and Dan Long. The survey aircraft, a Cessna P210, is shown behind the group.**

3. Other USDA Forest Service and contract personnel that assisted with the mission and provided Joel with a positive learning experience were Dan Long, Rapid City Service Center Biological Technician and Aerial Sketchmapper, and Lowell Lewis, INTECS International, GIS and Image Processing Specialist (see figure 2).
4. The aerial survey flights were conducted via grid flight patterns (parallel flight lines flown in cardinal directions spaced three miles apart) similar to the grid flight patterns taught to Joel and eleven other students in Brazil in April of 2002.
5. The aerial survey flights took place over the Black Hills of South Dakota and Wyoming where topography is similar to what is found in southern Brazil's pine growing regions. Additionally, nearly all of the trees growing in the Black Hills are Ponderosa pine, which, from the air, look much like the shortleaf and loblolly pines growing in Brazil where the European wood wasp is a serious economic pest.
6. Almost all of the tree mortality observed and sketchmapped was due to bark beetles (*Dendroctonus* and/ or *Ips* sp.) attacking Ponderosa pines. Although the way this mortality looks from the air (often referred to as the "pest signature") is somewhat different than European wood wasp damage, it provided a good and reliable pest signature for training purposes.
7. Although at times Dan Long and I used the D-ASM system, Joel spent the entire week

using USGS topographic (paper) maps, which are quite similar to topographic maps available in Brazil.

8. Joel was a quick study and by the end of the week he was placing a considerable amount of accurate information on his map. He also was able to reasonably approximate the number of trees affected in any given area and became proficient in using trees-per-hectare as an estimating technique. Although it often takes years to become an accomplished aerial sketchmapper, Joel is well on his way to becoming one. He now has the skills to produce good quality aerial survey maps in his homeland (see figure 3).



**Figure 3. The now seasoned aerial surveyor, Joel Pentead, “gearing up” for another day of mapping pine mortality over the Black Hills of South Dakota and Wyoming.**

9. Joel also had the opportunity to observe and demonstrate a new digital aerial sketchmapping system (D-ASM). This system uses a touch screen linked to a computer and global positioning unit (GPS). Sketchmap data is recorded on the touch screen using Landsat 7 imagery as a map base. On the last day, Joel sat with the laptop computer that was connected to my touch screen and was able to directly observe sketchmapping procedures.
10. The same Garmin GPSMAP 295 that was used in Brazil was used over the Black Hills to help the pilot keep the survey aircraft on the flight lines and to locate beginning and ending points of flight lines. Joel had an additional chance to observe this tool in action and indicated that EMBRAPA was interested purchasing one.

#### REFERENCE CITED

Ciesla, W.M. and E. W. Johnson, 2001. Aerial sketchmapping and other remote sensing technologies for assessment of the European wood wasp, *Sirex noctilio*, in Brazil: A feasibility study. Forest Health Management International, Fort Collins, CO, 34 pp.

Ciesla, W.M. and E. W. Johnson, 2002. Trip Report: Aerial Sketchmap Training in Brazil. Forest Health Management International, Fort Collins, CO, 11 pp.

#### TIMETABLE

August 17 Joel Penteadó departed Curitiba, en route, Denver, Colorado, USA.

August 18 Joel arrived Denver. Drove to Jefferson County airport in Broomfield and boarded the P210 to Rapid City, South Dakota.



**Figure 4. Another day at the office. Joel and Dan preparing for the day's flight.**

August 19 Joel, Dan and Erik surveyed the Bearlodge Mountains in northeastern Wyoming (see figure 4). Joel also watched four air tankers and four helicopters working the nearby Battle Creek fire. Lowell Lewis, providing technical support for the D-ASM system, arrived Monday afternoon.

August 20

Dan, Erik and Lowell flew the southern Black Hills using the D-ASM system. Joel spends a leisurely day resting and strolling around Rapid City. Joel, Lowell and Erik drove to the historic gambling town of Deadwood, South Dakota (see figure 5). En route, Joel observed native Ponderosa pine forests and witnessed helicopters doing bucket drops during firefighting operations on the Grizzly Gulch fire.



**Figure 5. Joel narrowly averting disaster at the hands of gunslinger Roy Rogers in Deadwood, South Dakota.**

August 21

Joel, Dan and Erik surveyed the southern Black Hills. Joel, Erik and Paul traveled to Mt. Rushmore National Monument. While driving home, Joel observed the Battle Creek Fire Type I incident command.

August 22

Joel, Dan and Erik surveyed the northern Black Hills. Dined at Rapid City's Chophouse on bison steaks celebrating the last night in Rapid City.

August 23

Joel, Dan and Erik surveyed the central Black Hills. Joel and Erik flew back to Denver and attended a Colorado Rockies baseball game.

August 24

Joel and Erik drove the Mt. Evans highway to the summit of Mt. Evans (elevation 14,100 feet). Spotted wildlife included bison, mountain goats, marmots, pikas, and golden eagles. Joel departed Denver, en route, Curitiba, Brazil.