

Tracking the Source of the Essequibo River in South America

The Essequibo River is one of the largest rivers in Guyana, South America, and flows 1,010 km through forests and savannah into the Atlantic Ocean. Travelling to the source of the Essequibo River, which lies in untouched rainforest in the Acarai Mountains, has been a huge challenge that not many scientists have faced.





Formulating a Plan

A multifaceted team accepted a challenge to film the never-before-recorded source of the Essequibo and its source valley.

Comprised of faculty from the School of Spatial Information at Germany's Dresden University of Applied Sciences, cinematographers and the producer from Blue Paw Artists, and an expedition team from Rupununi Trails, the group documented their journey for the French-German Public TV broadcast ARTE in HD and 3D.

But where should they begin? Before even setting out, the team had to first plan a course to follow. To do this, the Dresden University team collected geospatial data from NASA, the German Aerospace Center (DLR) and DigitalGlobe.

Mapping a Course to Follow

Unfortunately, due to a limited timeframe and almost permanent cloud coverage over the rain forest and its river system, WorldView, Terra-SAR and TanDEM-X data were unavailable. This meant that the only satellite data available were Landsat and ASTER-GDEM data.

Much of the Landsat image data was partially cloud-covered and of a radiometrically poor quality. Undaunted, the Dresden team utilized ERDAS IMAGINE's powerful image processing technology to layer stack the available data, pan sharpen it, and then combine numerous LANDSAT 7 scenes into a cloudless mosaic.

Added to these challenges is the fact that upper Essequibo - called the Sipu River is only about 5 meters wide. This means that the river itself was not visible in the data and made it virtually impossible to accurately pinpoint given the moderate spatial resolution of the Landsat data.

To combat this, the team used more of the powerful tools in ERDAS IMAGINE to create better views into the data. First, they combined the Landsat image data with an ASTER digital surface model to create a 2.5D surface model. Then they used the ERDAS IMAGINE terrain operators to generate other alternate visualizations like hill shades.

“Through the use of both field exploration and geospatial technology, the team was able to achieve a higher level of accuracy than ever before...”

Hitting the Trail

Fully equipped with the best plan technology could provide and with the support of members of the Amerindian Wai Wai tribe, the team set out on an eight-week journey to compare its data to the data collected by Hermann Robert Schomburgk, who first explored this area from 1837-1838 as a member of the Royal Geographical Society of London.

Once in the field, the work the team had done in preparing the surface model proved priceless. Several times, they were confronted with highly dense, inaccessible and impassable bamboo forest. Using the surface model in combination with the satellite image data, the team could find alternative routes through the forest to reach the source valley.

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Sharing the Journey

Through the use of both field exploration and geospatial technology, the team was able to achieve a higher level of accuracy than ever before, even given the monumental environmental challenges. The end result of this effort is a powerful television documentary called “Expedition Essequibo,” which was showcased at the residence of the European Union Ambassador and subsequently broadcast throughout Germany and France.

With the successful documenting of the source of the Essequibo River, this expedition also enriches the knowledge of southern Guyana with new scientific findings including unexpected bamboo forests, impressive biological discoveries, and collection of detailed GPS documentation for Guyanese officials and counterparts.

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