

helped the Koreans to get their ambitious and dynamic space program more known to the rest of the world and that it gives them a little more accessibility to other programs. Here, in this country, the interest is very high. The President [of Korea] said in his opening speech [to the Congress] that 90% of the population watched the KSLV-1 rocket launch on TV. I don't think that happens in any other country in the world.

Vietnam Looks To the Stars

by William Jones

The annual gathering of the International Astronautical Federation always presents an opportunity for the smaller nations to describe the efforts they are making to develop and utilize space technologies. Over the last few years, there has been an increased emphasis on encouraging the participation of young people in the conference. On Oct. 12-16, 2009, in Daejeon, South Korea, there were 700 youth in attendance. And indeed, many of the countries that are catching up in the new "space race," are putting much of their effort into the younger generation.

Perhaps no country has had a more difficult situation to overcome than Vietnam. In an almost continual state of war, from World War II until 1975, Vietnam has not had much time, nor resources, to devote to space science. Nevertheless, it is now taking its first steps to develop a space capability.

But as Thanh Tuong Nguyen, a teacher of Astronomy and Space Science at the Le Hong Phong High School for the Highly Gifted in Ho Chi Minh City, indicated in his presentation at the Daejeon conference, although Vietnam does not have a very long tradition of space science, it does have an astronomical tradition which has its roots in the peasant economy of the country, and which goes back centuries.

Vietnam, like most of the Asian countries, utilized the Chinese lunar calendar. Aside from the overall influence of Chinese culture in Asia, this calendar served very practical purposes. The most important product in their agricultural economy was rice, which demands a great deal of water. Therefore, the rise and fall of the



Thanh Tuong Nguyen

When Thanh Tuong Nguyen became the first high school astronomy teacher in Vietnam, in 2000, teaching supplies were nonexistent. Since then, he has introduced a simplified university astronomy textbook, a rotating sky map, a home-made solar clock, and field trips to observe the night sky. Here, students examine the rotating sky map.

water level in the rivers was of utmost importance for the Vietnamese peasant. This rise in turn was dependent on the phases of the Moon.

Peasants became quite adept at determining these phases, in which identifying the position of the heavenly constellations played a major role. But this was not a tradition that was easily transmitted from generation to generation, and not only because of general illiteracy. The written Vietnamese language was based on Chinese Han characters. As in China, this character script takes many years to master, and was really only accessible to the highly educated classes.

An Oral Tradition

The knowledge of the heavens required by the peasant to successfully grow his rice, was, therefore, transmitted orally. The farmer would memorize chants, called *caodao*, that could easily be transmitted from generation to generation, and which incorporated their knowledge of the seasons, the placement of the constellations, and the lunar progression. This was a form of rural astronomy that existed in the country for centuries, and was widely diffused among the peasantry.

There was also an Imperial Observatory, which, at the beginning of each lunar year, would issue a calendar of the seasons, divided into 36 weather periods, that would vary from year to year. But, even this calendar

was not so easy for the Vietnamese peasants to use, and so, they continued to rely on the appearances of a few key constellations in the night sky, and on their *caodao*, to determine the precise timetable for the planting of rice. Most familiar to the peasants were the Pleiades, Orion, and Scorpio constellations.

In 1975, when the war with the United States in Indo-China ended, an educational reform was planned in Vietnam. The French had made one important contribution to their former colony, in the form of a phonetic alphabet, which made learning the literary forms of the language much easier. The planned education reforms, however, didn't really take off until the 1990s.

In 2000, astronomy was introduced as a course at the Le Hong Phong High School for the Gifted, initially taught only to those who were planning to major in physics, but later, opened to non-physics majors. Professor Nguyen remains the only teacher of astronomy in Vietnam. Not surprisingly, some of the students from the rural areas had an easier time with the practical aspects of astronomy, undoubtedly due to their immersion in the *caodao* they had learned from their parents.

Solar Clocks and Water Rockets

Initially, lacking any high-school level texts in astronomy, Nguyen had to use sections of a university-level text for his classes, but improvised teaching materials as he went along. He scanned the "sky map" issued by the National Geographic Society to make copies for each student. He installed the software "Sky Watching" on the classroom computer. The students themselves constructed a "solar clock" and a rotating sky map. The course also received assistance from the Japan Aerospace Exploration Agency (JAXA), which introduced experiments with "water rockets."

Undoubtedly, progress toward the development of a real Vietnamese space program will be accelerated within a short period of time. The work of regional agencies, like the Asia Pacific Regional Space Agency Forum, which is working with Vietnam in the STAR



Thanh Tuong Nguyen

A popular activity of the Astronomy and Space Exploration Club at Le Hong Phong High School for the Gifted, is the launching of water rockets, introduced by the Japan Aerospace Exploration Agency.

(Satellite Technology for the Asia-Pacific Region) program, is helping to boost the entry of Vietnam into space.

The Vietnam Space Technology Institute, which was established in 2006, is working with NASA and the Mexican National University, which are assisting the Institute in a small satellite program. The infant space program is also receiving assistance from some of the Vietnamese nationals who have made a name for themselves abroad, in the fields of astronomy and aerospace.

These include several Vietnamese astronomers, such as Dr. Nguyen Xuan Vinh, who does work for NASA from his post at the University of Michigan; Dr. Nguyen Quang Rieu, who works at the National Observatory of France; and Dr. Trinh Xuan Thuan, a professor of astronomy at the University of Virginia. Two of them have received the Glory of the Vietnamese Nation awards from the Government of Vietnam for their achievements.

In his own autobiographical comments, Dr. Rieu recalls how he, as a boy in Vietnam, would climb the local hill, which was used for observing the constellations—a remnant, no doubt, of the rural astronomy tradition so colorfully depicted by Professor Nguyen in his Daejeon presentation.