try to have poor neighbors.

Malinga: You close borders, and do other things, and spend so much money. We have a center where we keep people who come in to the country, and then deport them. We are paying a lot of money doing that. Whereas, if their economies were okay, they would stay. Home is home. Everyone wants to get home, as long as the conditions are okay. Having said that, it's a challenge, but it's very important.

initiative.wordpress.com/category/satellites/

Government representatives signing a memorandum of understanding, during the Third African Leadership Conference on Space Science and Technology for Sustainable Development, in Algiers, in December 2009. The African Resource Management Constellation involves an initial collaboration of Nigeria, South Africa, Kenya, and Algeria.

21st Century: Do you think this Astronautical Congress will have an impact, especially on young people, and education?

Malinga: I think it has done a great job. We had more of our students who otherwise would not have been exposed to this. They came, they attended. Our professionals, also. But, I have a feeling we could have done better, on attendance. I'd expected it to be more.

I think the impact will be immense, going forward. People will look back. Can you imagine the kind of impact that is made on young people? NASA Administrator Charles Bolden spoke to school kids. It's amazing what that does for a child. I go to places in schools and say, "Just remember this day." Probably this is where your space career started; when someone came and spoke to you about space.

21st Century: That's what many of the astronauts on their Congress panel said had inspired them.[1]

Malinga: So it has an amazing impact, to see someone like you saying to us, "I can actually do this myself."

1. See *EIR*, Oct. 7, 2011, for the Apollo astronauts' testimony before Congress.

INTERVIEW: DR. PETER MARTINEZ

We See an African 'Astronaissance'

South African scientist Peter Martinez headed the Local Organizing Committee for the International Astronautical Congress (IAC). Dr. Martinez is the chairman of the South African Council for Space Affairs, which oversees space activities in South Africa, and he is division head for Space Science and Technology at the South African Astronomical Observatory. Dr. Martinez has made important contributions to the development of South Africa's national space policies. He holds a doctorate in astrophysics from the University of Cape Town, and contributes to international policymaking in space affairs.

At the final count, 345 African delegates, from 13 African nations, attended the Congress. A special Developing Countries Support Programme (DCSP) had been organized by the International Astronautical Federation to support the participation of delegates. Twenty of the 30 participants supported by the DCSP program were from Africa.

Dr. Martinez was interviewed by Marsha Freeman on Oct. 3, 2011 in Cape Town.

21st Century: As the head of the local committee that organized this first-ever Congress of the International Astronautical Federation in Africa, you must be very pleased by the turnout.

Martinez: We've got about 2,800 delegates registered. We're very excited about that. I think it shows the interest by the global space community in finding out about that's happening in the African space arena, and the potentials that it holds, not only for space in Africa, but the potential for cooperation and commercial applications of space technology in Africa and the markets associated with that.

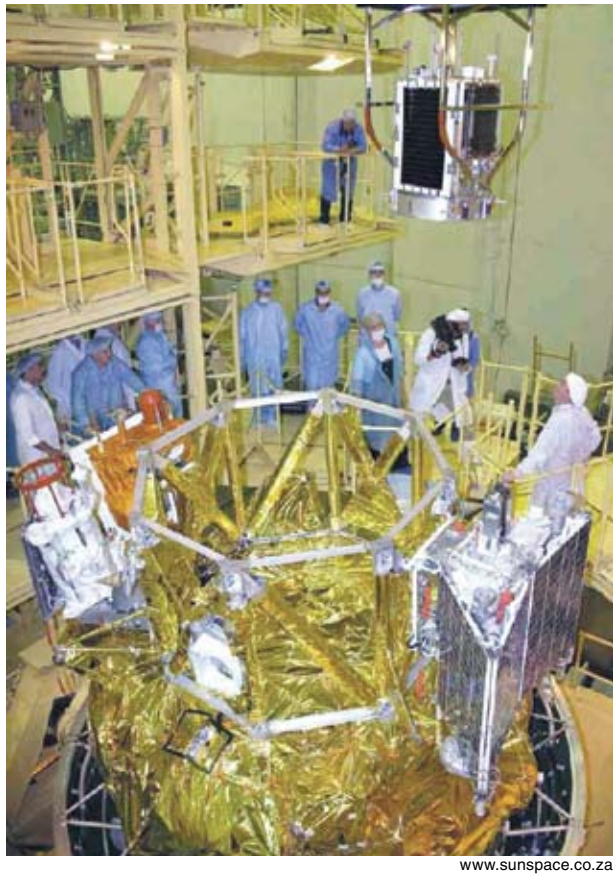
21st Century: How many African countries sent delegates to the Congress?

Martinez: There are 53 countries in Africa, and I would be surprised if all 53 are represented here; it will probably be fewer than half. But still, in terms of space development in Africa, that would be a significantly higher number than you might have attracted, had this Congress

been held, say, 10 years ago. We're seeing a birth of a number of space programs in Africa, hence the theme of the conference, "An African Astronaissance."

21st Century: All of the speakers at the opening session of the Congress today made it very clear that they were welcoming the delegates from all over the world, on behalf of *all* of Africa.

Martinez: We were very conscious that this was the first IAC for the continent, and when we bid to host it, we submitted our bid as an African bid. Our perspective has always been that it's a Congress *for* Africa, and we've taken a great deal of care to involve our African colleagues in the planning leading up to this Congress, and to ensure that this Congress responds not only to our interests and needs, but the interests and needs of Africa, in general.



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The SumbandilaSat (upper right) being integrated on Fregat for launch at Baikonur. Dr. Martinez pointed to the inspirational role of South Africa in space for the rest of the continent.

An All-African Space Agency?

21st Century: Last year, at a conference of African leaders, there was discussion of forming an African Space Agency, similar to the European Space Agency. At that time, you were quoted saying that such an organization would be premature. What are your thoughts on that?

Martinez: This exact question was discussed at the African Leadership Conference on Space Science and Technology, held in Mombasa last week. And I am pleased to say that the heads of the other African space agencies who were on the panel discussing this very subject, all expressed views very much in line with my own personal opinion, which is that it would be premature at this stage for Africa to develop a continental space agency.

I think where we are now is, that we're seeing the birth of coordinated space activities at a national level. Countries need to develop their space activities, and experience, and operational programs first, and then develop experience in cooperating with each other in executing space activities jointly.

The poster for the African Leadership Conference on Space Science and Technology in Mombasa, where heads of the African space agencies discussed collaboration.

There are many, many challenges and issues to overcome in conducting joint space projects. In the fullness of time, I think we will see whether we need a continental space agency, or if some other modality of cooperation would suffice. It's not clear to me that one needs to establish a new institution. Perhaps just very good coordination and networking among a series of strong African space agencies would achieve the same results, but in a more efficient manner.

21st Century: How have the development and achievements in South Africa in space science and technology radiated to other African nations?

Martinez: I think the most significant role, perhaps, is an inspirational one, of being a kind of role model for the African continent, demonstrating that such things *can* be done in Africa, by Africans. An example of that is the Sumbandila satellite, which was developed in South Africa, and designed, built, and operated in this country, with, really, a very small percentage of components that were imported from elsewhere.

Other projects, such as the Southern African Large Telescope, which is currently the largest single telescope in the Southern Hemisphere, and projects like the MeerKAT radio telescope—all of those demonstrate technological and scientific capability here, on the continent, and, I think, serve to inspire other African nations. And, incidentally, I should say that all of these projects are being pursued in a manner that is quite open to collaboration with other African countries.

In terms of the MeerKAT and Square Kilometer Array (SKA) projects—the SKA is very much an African bid to host this very large instrument, simply because of the continental dimensions of the array, once it's built. So we have stations as far

north as Ghana, which are projected; and interestingly, Nigeria is another country in the region that has strong capability in radio astronomy. It's very exciting to be working with these countries on SKA.

Also, in the domain of satellite technology, there is an African Resource Monitoring Constellation. This is a project whereby each country contributes one satellite to the constellation, but has access to the data from the other satellites. At the moment, the ARMC project is being led by Algeria, Kenya, Nigeria, and South Africa, but it is, in principle, open to other countries to join at the level appropriate to their development and needs.

The South African Astronomical Observatory (SAAO) is the national center for optical and infrared astronomy in South Africa, and home to the largest single telescope in the Southern Hemisphere. The larger view, with SALT in the foreground, shows the older and smaller telescopes seen at the other end of the plateau. Inset is a close-up of the South African Large Telescope (or SALT).

SAAO

INTERVIEW: DR. LEE-ANNE MCKINNELL

What Is the Weather in Space?

Dr. Lee-Anne McKinnell is the managing director of space science at the South African National Space Agency (SANSA), and former acting managing director at the Hermanus Magnetic Observatory. Her area of research is in the development of an ionospheric model for application to communication in the ionosphere.

In addition to her scientific research, she plays a leading role in developing a new generation of young scientists from the nations of Africa.

She was interviewed by Marsha Freeman on Oct. 6, 2011, during the International Astronautical Congress in Cape Town.

SANSA

21st Century: Can you give us a bit of the history of the Hermanus Magnetic Observatory, and why it was built in South Africa?

McKinnell: It was started in 1937 at the University of Cape Town, for measuring the Earth's magnetic field, which was needed at that time. But by 1940, they realized that when you measure the Earth's magnetic field, you want to do it as accurately as possible, in an area where there are not outside influences.

In Cape Town, where the University was based, there was an electric railway line, and the system was causing inaccuracies in the measurements they were trying to make. So they decided to move the observatory to a place which is what we call "magnetically clean," where there are no serious external influences on the Earth's magnetic field. They looked for a town that didn't have a railway line. And Hermanus, which is 120 kilometers from Cape Town, off the coast, had no electric railway in those days—and still doesn't today, thankfully, so the Observatory was placed there.

At Hermanus, we have 16 hectares of land, and in the middle, we have a magnetically clean area, which is where we take the measurements of the Earth's magnetic field. All of the buildings use non-magnetic material and are built with non-magnetic material, and we restrict activities in that area. We don't allow people to dig and put up structures that have magnetic components. We preserve the pristine nature of that.

21st Century: I believe there have been changes over time in the strength of the Earth's magnetic field. Have you seen this in your measurements?

McKinnell: You are absolutely right. The reason why we want to measure the Earth's magnetic field in different places is because it's changing, and it's different in different places. SANSA, at the moment, operates four permanent field observatories, where we have accurate instrumentation to take measurements, in South Africa and in Namibia. Hermanus is one of them; and then we have one in Hartebeesthoek, which is north of Pretoria, and then there are two in Namibia, at Tsumeb and Keetmanshoop.

All four these have INTERMAGNET (International Real-Time Magnetic Observatory Network) status, which is an in-