**‘NISAR satellite can monitor tectonic movements accurately’**

Amid the hectic activity at the Indian Space Research Organisation (ISRO) ahead of its NISAR satellite launch, the space docking experiment (Spadex) this year-end, and the Gaganyaan mission, The Hindu spoke to ISRO Chairman S. Somanath. Excerpts:

What is unique about NISAR (NASA-ISRO Synthetic Aperture Radar) satellite? We are going to launch it from Sriharikota. In what way will NISAR benefit India and the U.S.?

This is a Synthetic Aperture Radar satellite with two bands — S-band and L-band. The S-band payload has been made by the ISRO and the L-band by the U.S. The U.S. will contribute the large deployable antenna. It can fully cover the earth in approximately 14 to 15 days, in radar. It can monitor the tectonic movements to centimetre accuracy. It can measure water bodies accurately. It can look at water stressing on the earth, wherever there is deficiency of water. It can ground-penetrate to a certain depth. It is capable of monitoring the vegetation cover and snow cover. It, therefore, basically looks at the whole of the earth in terms of surface, water, greenery and all of that. It gives full coverage of the earth two times a month.

We can study climate change-related issues, agricultural changes through patterns, yield, desertification and continental movements precisely. It can measure tectonic plate movements accurately. So a lot of geological, agricultural and water-related observations can be obtained from the satellite.

You said its radars can penetrate the ground. Can they locate buried archaeological sites?

No. That needs a radar which is close to the surface. This is monitored from such a height.

Will the NISAR launch take place in July?

There are some issues with the satellite. It is supposed to go in July but it may go only in October-November.

What is the problem?

I cannot tell you because it is on the spacecraft on the U.S. side. They wanted to do some corrections. So they have taken it back.

What are the features of Chandrayaan-4, which will be a sample-return mission?

Chandrayaan-4 is currently a concept we are working on. It is part of a series of missions we propose to do before we land on the moon with a man. Since we have made a plan to land on the moon by 2040, Chandrayaan-4 is one of the many of those such missions with which we are trying to explore the Moon.

So we looked at what Chandrayaan-4 should do. The first thing that came to our mind was that we should bring back samples from the Moon. It is almost twice the work of Chandrayaan-3. We do not have a rocket capable of taking such a satellite [to the moon].

So we have devised a new method by which Chandrayaan-4 [spacecraft] can go there, drill, take samples and bring them to the earth. The detailed design of Chandrayaan-4 is going on. We have to go to the government to seek approval.

The Chinese sent a spacecraft to the moon some days ago to bring back soil samples...

I have nothing to say on it.

When will you do the Spadex (space docking experiment, which will entail two satellites docking in space)?

We are targeting this year.

What have you done so far in the project?

We have realised the satellites. Currently, we are going through testing and docking on the ground. Everything has been successful. The entire mechanism – computers and everything – is finally getting ready. It will go through assembly, testing and a flight model. Then it will go for a launch. We target it this year-end.

So it [Spadex] will be a precursor to the ISRO building a space station.

Docking is one of the technologies required to be demonstrated — autonomous docking. That is why we are launching this mission.

The U.S. has invited an Indian astronaut to fly to the International Space Station (ISS). Of the four astronauts selected for the Gaganyaan mission, will you send one to the ISS?

Yes. That is our plan. One of them should fly [to the ISS]. We are planning to have that this year itself,

At what stage is the Gaganyaan project?

Right now, the helicopter air drop test work [of the crew module] is going on at Sriharikota. So all of them are there now.

Is the training of the four astronauts still going on in Bengaluru? They had completed their training near Moscow.

Now we have to send them to the U.S.

How about Sukhrayaan project? Will the ISRO send a probe to Venus?

We have completed all the designs, all the configurations. We are seeking approval from the government.