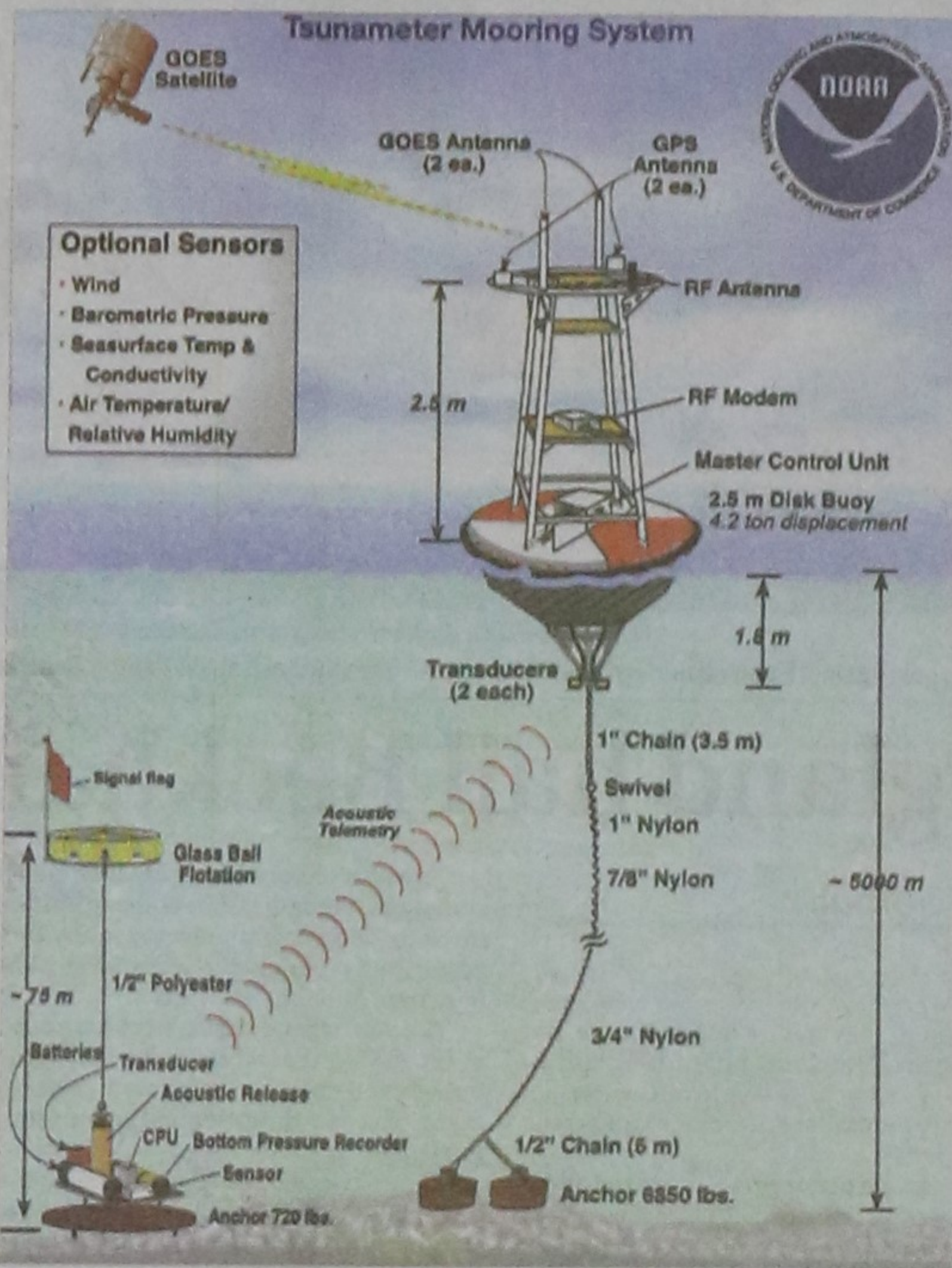## TECHSPOTLIGHT

Is DART the solution?

Proposed Deep-ocean Assessment and Reporting of Tsunamis in the Bay of Bengal

NOMANA INTEKHAB HADI

BANGLADESH is in need of planting the DART (Deep-ocean Assessment and Reporting of Tsunamis) system to mitigate losses due to tsunami. On September 13 in 2007, Bangladesh issued Tsunami alert in the coastal region of Bangladesh saying that Tsunami might hit the coastal parts of Bangladesh. After December 30 of that year, Bangladesh survived the effects of Tsunami, due to the natural barrier of its continental shelf stretching 200 km into the Bay of Bengal, reported the official Bangladesh News Agency.

The possibility of Tsunami depends on the distance from the earthquake which causes it. It also depends on how deep in the ocean the earthquake was. In Chittagong, the second largest city of Bangladesh, according to a newspaper report, in 1997 two high magnitude earthquakes occurred in a span of three days. This is unusual since earthquakes of such magnitude occur only about once a year on an average.

In the Bay of Bengal tides are the result of imbalanced, extraterrestrial, gravitational influences of the moon, sun, and planets. These waves were termed as "seismic sea waves" by scientists which is misleading. "Seismic" implies an earthquake-related generation mechanism but a tsunami can also be caused by a non-seismic events. In fact tsunamis are generated by landslides, volcanic eruptions,

Fig 01

explosions, and by the impact of cosmic bodies, such as meteorites besides underwater earthquakes. These disturbances cause the seabed to move swiftly and shift a large amount of water and disrupt the sea surface.

During the NUS-TMSI workshop on "Earthquake and Tsunami" held in 2007 concern was raised and discussed that the DART project should be immediately implemented. The proposed sea area is seen in fig 01.

The information collected by a network of DART systems positioned at strategic locations throughout the ocean plays a critical role in tsunami forecasting. When a tsunami event occurs, the first information available about the source of the tsunami is based only on the available seismic information for the earthquake event. As the tsunami wave propagates across the ocean and successively reaches the DART systems, these systems report sea level information measurements back to the tsunami warning centers, where the information is processed to produce a new and more refined estimate of the tsunami source. The result is an increasingly accurate forecast of the tsunami that can be used to issue watches, warnings or evacuations.

Several numerical tsunami models have been developed in the past, which can describe reasonably well the tsunami propagation in Deep Ocean, once the source region information is properly provided. These numerical models can estimate the direction of tsunami propagation and the wave height distribution from the source region to the near shore areas. Based on these numerical models, several frameworks for establishing tsunami hazard mitigation programmes and early tsunami warning systems have been discussed and proposed.

Proposed Initiative addresses:

1) Source parameter identification: Numerical modeling of tsunamis will not be useful for assessing tsunami hazards unless reliable input data are available, which include earthquake source parameters (epicenter, depth, magnitude, rupture plane surface area, dip angle, slip angle and strike angle) and accurate bathymetry database.

● Collect and analyse seismograms and earthquake data so that earthquakes in this region can be systematically relocated and the focal mechanisms re-determined using the latest seismological methods and techniques.

● Survey and collect bathymetry data along the trenches for improving the accuracy of modeling tsunami generation.

● Develop better tsunami generation model to include the effects of horizontal seafloor displacements and landslides.

2) Validation and development of accurate and reliable tsunami simulation models

Several numerical models describing tsunami propagation and inundation have been developed that can provide reliable estimates of tsunami arrival times.

● Establish benchmark problems to determine the accuracy of these simulation models for calculating near shore hydrodynamics including tides, breaking waves, bottom friction, overland flows, flow-structure interactions, and the resonated motions in a semi-enclosed region such as a bay.

● Survey and collect bathymetry and topography data in the coastal zones around the Bay of Bengal

● Survey and calibrate existing tide gages and install new near shore sea water level sensors.

● Develop a comprehensive tsunami modeling system, probabilistic and statistical approaches to estimate tsunami potentiality and impact.

3) Development of tsunami early warning system and fast tsunami forecasting: Since limited resources will be available for installing and maintaining deep water sensors, it is important to develop a scientific methodology for determining the optimal locations of these future sensors. Moreover, for an accurate and fast tsunami forecasting, once a tsunami is detected by a sensor, an algorithm needs to be developed to ensure in two ways:

● Design an algorithm for an early tsunami warning system by determining where and how many sensors to install. The goal of Sensor Optimal Placement algorithm is to identify the best location for deepwater sensors and to give ample warning time.

● Design an algorithm for fast forecasting of tsunami using data detected by deepwater sensors. Although a procedure for tsunami forecasting using the senor data has been established by warning system.

4) Tsunami coastal effects and hazards mitigation programs

● Develop new inundation metrics for inundation maps that account for wave heights, velocities and force indices.

● Develop design guidelines for coastal structures to improve their resistance/resilience.

● Implement probabilistic hazard analysis into the inundation maps.

Public awareness should be raised in this regard. Government and non-government authorities should extend their helping hands to promote DART in Bay of Bengal to reduce TSUNAMI LOSSES.

The writer is a Graduate of NUS (National University of Singapore).

TECHVIEWS

Microsoft launches portals for developers and IT professionals

ADIL MAHMOOD

MICROSOFT Bangladesh on Wednesday announced that it would run two online community portals each for developers and IT professionals in Bangladesh.

Microsoft Bangladesh launched msdnbangladesh.net (developers) and techbangladesh.net (IT Professionals) in a ceremony held at the BIAM Foundation auditorium in the Capital.

These portals are the realisation of Microsoft's commitment to create and build strong knowledge based ICT community in Asia and uplift the software development and IT engineering in the country.

The event kicked off with the inaugural speech by Moshiur Rahman, solutions manager of Microsoft Bangladesh, who then introduced Risman Adnan, developer evangelist of Microsoft Regional Asia. Feroz Mahmud, country manager of Microsoft Bangladesh was also present in the occasion along with other officials.

"Internet has created incredible new opportunities for people around the world to meet and share ideas about topics they care about. These portals are the special ones, the first online communities for IT professionals of Bangladesh who are working with Windows systems on Microsoft platform", said Rahman.

Risman Adnan gave a presentation on the topics 'Lap around Microsoft Web Platform and Technologies' and 'Developer Introduction to Windows 7' to the audiences; who were mostly IT professionals, developers and students of different organisations and universities.

"Every time a new door opens online, it creates opportunities for people to share their experiences, exchange ideas, collaboration and innovation," said Risman Adnan.

He also provided the main theme of the MSDN and Technet portals as 'Next generation software developer and IT professional community in Bangladesh'.

Risman Adnan also said that a very promising number of IT developers and professionals are there to move Bangladesh forward as a key player in worldwide IT ecosystem. As Bangladeshis have very good English skills, the potential of becoming the second outsourcing option after Philippines are there. And a strong developer and IT professional community is one key indicator of that potential.

The MSDN and Technet portals will provide free memberships with the opportunity to interact with Microsoft's people and partner in the Asia-Pacific region. These portals will create a new gateway of online interaction and collaboration among developers and IT professionals by providing features like online blogs, forums, user groups, wikis, media gallery, media streaming, news letter and job posting.

MSDN Bangladesh portal will focus on next generation software development technologies such as ASP.NET, Silverlight 2.0, Azure Service Platform and parallel computing while Technet Bangladesh portal focuses more on core infrastructure and platform technologies like Windows operating system specially Windows latest beta version Windows 7 (Client and Server), Exchange Server, SQL Server,

Risman Adnan speaks at the event.

Sharepoint, BizTalk Server and Unified Communication. Risman Adnan provided a brief description of all the contents in his presentation.

In his concluding speech Feroz Mahmud said, "We can all learn from each other as we are in the knowledge industry. We will share and exchange our views, works and thoughts to other developers and IT professionals through these two portals and to make sure that everyone has access to ICT, even for the people living in remote areas".

He also told the audiences that as Microsoft basically focus on people to improve productivity in every sector of life, they usually spend a huge amount of money in Research and Development (R&D) to serve the best product to the consumers thus they can enhance their efficiency.

TECHNEWS

Revolutionary microchip on cards

MAHDIN MAHBOOB

RESEARCHERS at Rice University (USA) and Nanyang Technological University (Singapore) have developed a microchip that is cleaner and greener and yet 7 times faster than the chips in use today!

In the first real-world test of a revolutionary type of computing that thrives on random errors, scientists have created a microchip that uses 30 times less electricity while running seven times faster than today's best technology. The U.S.- Singapore team developing the technology, dubbed PCMOS revealed the results recently at the International Solid-State Circuits Conference (ISSCC), the world's premier forum for engineers working at the cutting edge of integrated-circuit design.

Conceived by Rice University Professor Krishna Palem, PCMOS is built on the "complementary metal-oxide semiconductor" technology, or CMOS, that chipmakers already use. That means chipmakers won't have to buy new equipment to support PCMOS, or "probabilistic" CMOS. Although PCMOS runs on standard silicon, it breaks with computing's past by abandoning the set of mathematical rules -- called Boolean logic -- that have thus far been used in all digital computers. PCMOS instead uses probabilistic logic, a new form of logic developed by Palem and his doctoral student, Lakshmi Chakrapani.

"PCMOS is fundamentally different," Palem said. "We lower the voltage dramatically and deal with the resulting computational errors by embracing the errors and uncertainties through probabilistic logic."

PCMOS was jointly validated by Rice and Nanyang Technological University (NTU) in Singapore via a joint institute that Palem founded in 2007, the Institute for Sustainable Nanoelectronics (ISNE). Directed by Palem, ISNE is based at NTU, where the first prototype PCMOS chips were manufactured last year in collaboration with Professor Yeo Kiat Seng and his team.

The prototypes were application-specific integrated circuits, or ASICs, that were designed solely for encryption. Unlike the general-purpose microprocessors that power PCs and laptops, ASICs are designed for a specific purpose, and they are "embedded" by the millions each year in a growing constellation of products like automobiles, cell phones, MRI scanners and electronic toys.
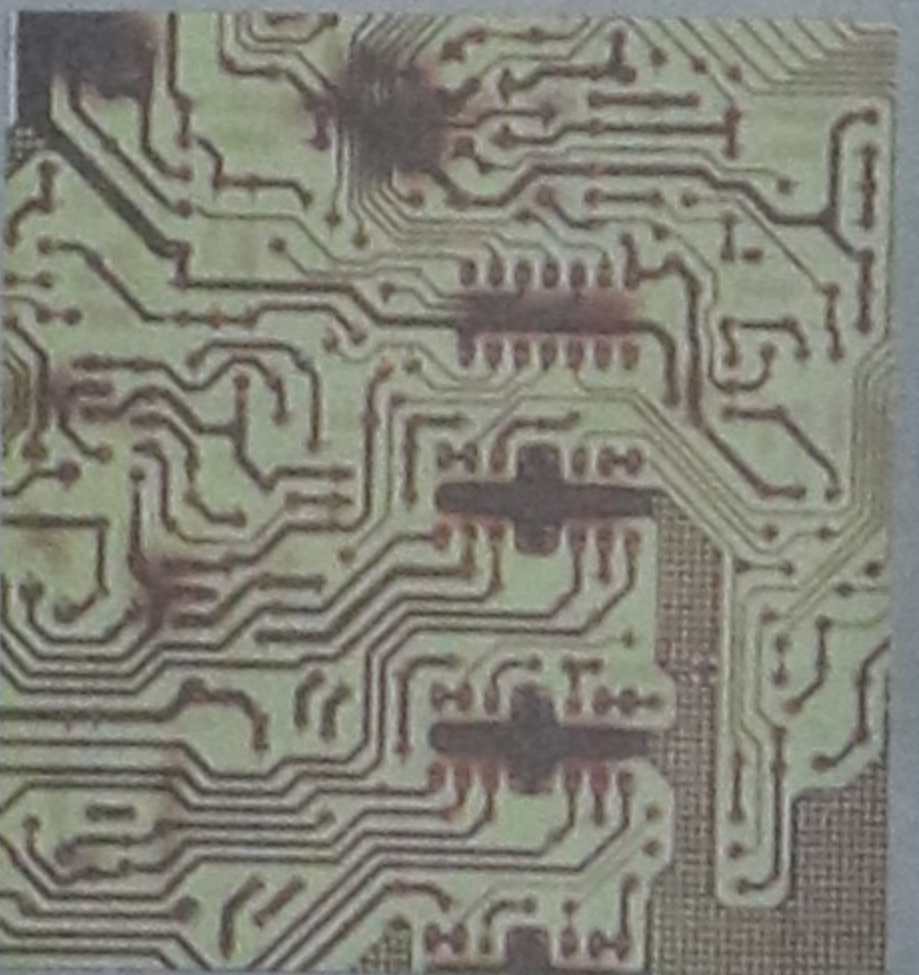

perfect pictures, results in a case where the picture looks just as good with a calculation that's only approximately correct.

"The key is to consider the value that the computed information has for the user," said Palem, who directs Rice's Value of Information-based Sustainable Embedded Nanocomputing Center, or VISEN. "Our goal is green computing. We're looking for applications where PCMOS can deliver as well as or better than existing technology but with a fraction of the energy."

If PCMOS can slash energy use for embedded ASICs in key devices, the implications are enormous. For consumers, it could mean the difference between charging a cell phone every few weeks instead of every few days. Globally, that would help reduce the information technology industry's carbon footprint.

Information Source: Rice National Media Site

PHOTO TECH
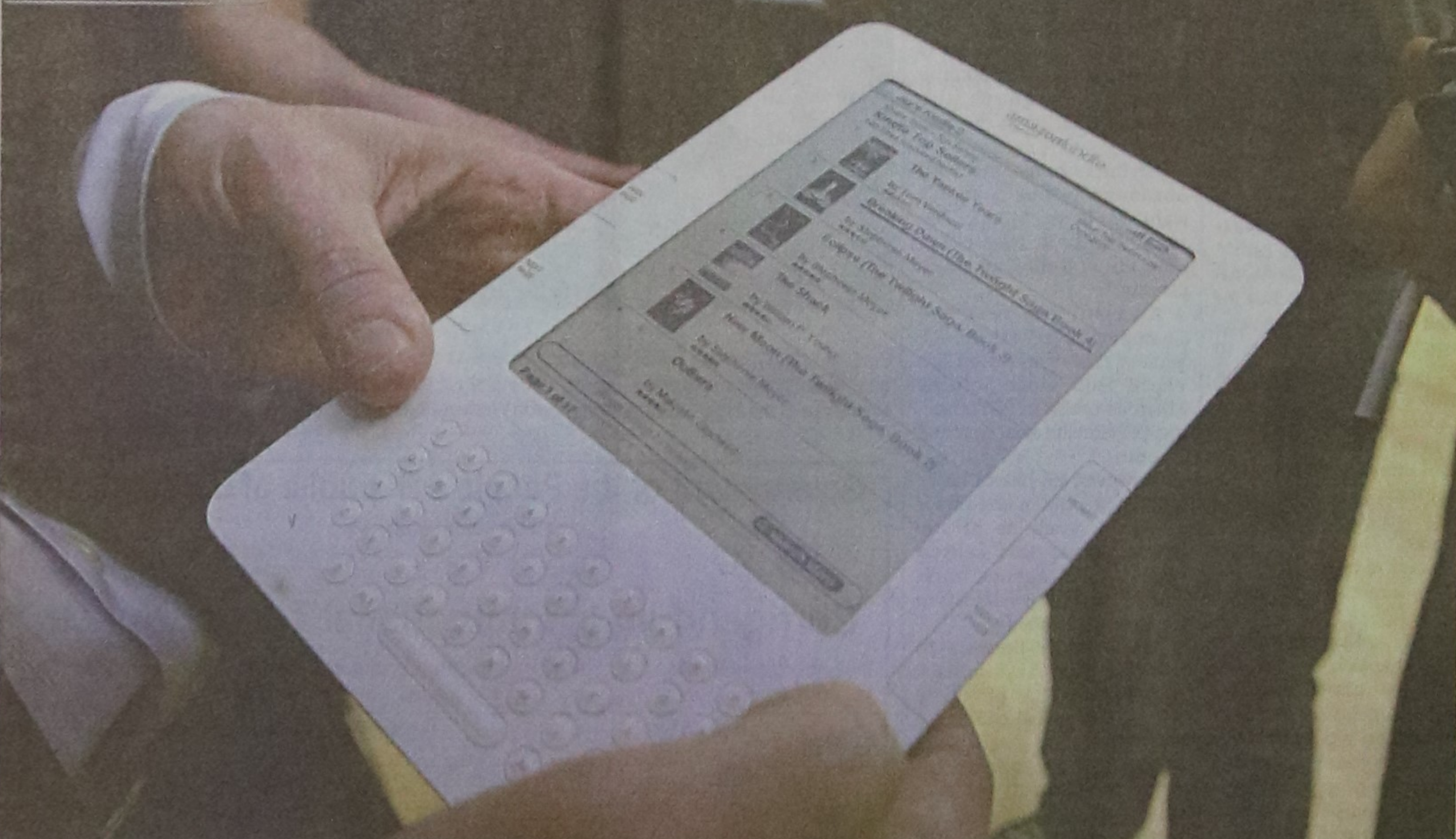
AMAZON KINDLE 2
A man holds the new Amazon Kindle 2 at an unveiling event at the Morgan Library & Museum on February 9 in New York City. The updated electronic reading device is slimmer with new syncing technology and longer battery life and will begin shipping February 24th.

PHOTO: AFP