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## **1. NASA loses contact with Mars helicopter: Everything you need to know about Ingenuity**

### **Why in news?**

The National Aeronautics and Space Administration (NASA) lost contact with its Mars helicopter Ingenuity towards the end of its 72nd flight on the red planet on January 18. The small robotic chopper is the first aircraft in history to make a powered, controlled flight on another planet.



*Figure 1 NASA's Ingenuity helicopter on Mars*

### **When and why was Ingenuity sent to Mars?**

On July 30, 2020, NASA launched a spacecraft towards Mars, carrying the Perseverance rover, which had Ingenuity attached to its belly. On February 18, 2021, Perseverance successfully landed on the red planet. However, it wasn't until April 4 that the helicopter was deployed on the surface. It was only after the rover reached a suitable "airfield" location, it released Ingenuity to the surface.

While the rover's mission was to study signs of ancient life, and collect samples that might be sent back to Earth during future missions, Ingenuity was sent to Mars as an experiment to test powered, controlled flight on another world for the first time.

### **Why was Ingenuity's flight on Mars a big deal?**

The chopper made its first flight on Mars on April 19, 2021. It rose to a height of 10 feet, hovered for 30 seconds, and then descended back to the ground. The flight lasted 39.1 seconds. This was a big deal for two reasons. One, as mentioned before, Ingenuity was the first aircraft to fly on another planet. Two, it managed to fly in Mars' thin atmosphere, which isn't conducive for flying.

According to NASA Jet Propulsion Laboratory (JPL), Flight at Mars is challenging because the Red Planet has a significantly lower gravity – one-third that of Earth's – and an extremely thin atmosphere with only 1% the pressure at the surface compared to our planet. This means there are relatively few air molecules with which Ingenuity's two 4-foot-wide (1.2-meter-wide) rotor blades can interact to achieve flight.

Notably, Ingenuity is an autonomous aircraft. Perseverance acts as a relay between the chopper and Earth.

### **How did Ingenuity's mission evolve?**

In the weeks after its first flight, Ingenuity made four more flights of increasing time, speed and velocity. This was supposed to be the end of its mission. The plan was that Perseverance would leave the chopper behind and carry on with its scientific research.

However, scientists began to use Ingenuity for scouting. When Perseverance set off to explore the rocks to the south, Ingenuity went along, now scouting the terrain ahead of the rover.

Before it went missing, Ingenuity had made 72 flights, staying aloft for more than 128 minutes and covering a total of 17.7 kilometres.

Relevance: GS Prelims

Source: The Indian Express

## **2. How ARM-based chips can revolutionise Windows laptops this year**



### **Why in news?**

Windows is all set to finally catch up with Apple, when it comes to adopting ARM-based SoCs/chips for its thin-and-light laptop lineup.

A recent benchmarks test run by XDA Developers saw an Asus Zenbook 14 2024 with Intel's 14th Gen Meteor Lake processors pitted against the ARM-based Snapdragon X Elite SoC from Qualcomm. Qualcomm's processor significantly

outperformed Intel, in single-core, multi-core, and graphics performance — pushing the door open for Windows to make its mark in this segment, dominated by Apple since it launched its revolutionary M1 MacBook in 2020.

### **But first, what is ARM — and how is it better?**

Before understanding ARM, one must first understand what SoC, or 'System on a Chip', is. In simple terms, SoC is a single integrated chip that includes all the components required to run a whole CPU. In a typical CPU, the processor chip, the RAM, the storage and so on, exist as separate components — all these exist on a single chip in an SoC.

ARM or 'Advanced RISC Machine' is the name of a CPU architecture. Now ARM-based SoCs are not new — they have been in use on smartphones for a long time. What they provide, in comparison to the x86, x64, or even Intel's own x86-64 processors (like the above-mentioned Meteor Lake) is much higher battery efficiency and faster processing.

However, such chips were restricted to smartphones until Apple debuted an ARM-based SoC on its M1 MacBooks, launched in November 2020 — the company called this chip Apple Silicon.

### **Why was the M1 MacBook revolutionary?**

These laptops provided unseen-before battery life and processing efficiency — a measurement of how smoothly an operating system runs, how quickly it opens and closes programs, and read/write speeds.

Why? Apple Silicon or its ARM-based M1 chip, the first in Apple's M-series. In fact, since 2020, Apple Silicon has only gotten better. Most recently, the tech behemoth came out with the M3 MacBook Pro. Apple claims a 15 per cent increase in performance on M3 chips compared to the last gen M2.

### **What is the challenge for Windows, when it comes to ARM-based chips?**

Crucially, some Windows laptops already offer ARM-based chips. The company came out with an ARM version of Windows (called 'Windows on ARM') as far back as 2016. However, till date, there are only a handful of options for Windows laptops with ARM processors.

There exists a glaring problem. When Apple came out with Silicon, developers of MacOS programmes had to put in a lot of work to optimise programmes for revolutionary SoCs. In fact, owing to the sheer number of apps that had to be optimised, early M1 Mac users missed out on many programmes. Windows faces the same problem.

Currently, the only apps that work very well, and show that ARM magic, are the Office Suite (Word, Excel, PowerPoint, etc) and Microsoft Edge. Almost all other necessary programmes that an average Windows user needs, need to be optimised.

### **So, what's there to look forward to?**

There is hope for Windows users, though. Qualcomm recently announced its brand new Snapdragon X Elite SoC for Windows, which the company claims can go toe-to-toe with Apple's latest M3 series of chips, in terms of performance.

With the success enjoyed by the chips in early tests, industry experts hope that they signal Windows' intention to fully, and seriously, adopt this technology for its laptops.

Relevance: GS Prelims; Science & Technology

Source: The Indian Express

## **3. What are labour rules for workers abroad?**

### **Why in news?**

The Uttar Pradesh and Haryana governments, with the help of the National Skill Development Corporation (NSDC), have started the process of recruiting about 10,000 workers to go to Israel, primarily for construction activities. The NSDC website describes it as a "passport to dreams abroad", and a chance to "discover new horizons in Israel". There are 2,000 openings for plastering workers, 2,000 for ceramic tile workers, and 3,000 each for iron bending and frame workers with monthly salaries of about ₹1.37 lakh (6,100 Israeli shekels). Screenings have started in various locations in Haryana and U.P. with the help of State governments.

**Who are opposing the move?**

Trade unions have opposed this move, citing the Emigration Rules under the Emigration Act. They are planning to challenge this employment drive legally. The central trade unions told the media that such a move is against the Indian ethos of bringing back citizens from conflict zones. The trade union leaders alleged that the BJP-led government was using unemployment among the youth and workers to further their "politics of hate" to please Israel. Several hundreds of people, meanwhile, turned up at the screening centres in Haryana.

**What do the Rules prescribe?**

Workers going to conflict zones or places without sufficient labour protections are required to register with the Ministry of External Affairs' 'e-migrate' portal. Passports issued under the ECR (Emigration Check Required) scheme cover workers travelling to 18 countries, including Afghanistan, Bahrain, Indonesia, Iraq, Jordan, the Kingdom of Saudi Arabia, Kuwait, Lebanon, Libya, Malaysia, Oman, Qatar, South Sudan, Sudan, Syria, Thailand, the UAE, and Yemen. Israel is not on this list and the 'e-migrate' system will not be used for those going to Israel despite continuing violence due to Israel's bombing of Gaza.

**What are the international practices?**

The international practices for protection of migrant workers are governed by two conventions of the International Labour Organisation: the Migration for Employment Convention (Revised), 1949 (No. 97) and Migrant Workers (Supplementary Provisions) Convention, 1975 (No. 143). While India has not ratified both conventions, Israel had ratified the 1949 convention in 1953. The 1949 convention says: "Each Member for which this Convention is in force undertakes that it will, so far as national laws and regulations permit, take all appropriate steps against misleading propaganda relating to emigration and immigration. For this purpose, it will where appropriate act in co-operation with other Members concerned."

The Israel Defense Forces spokesman Doron Spielman had told media that "there is not a place in Israel that is safe now" due to Hamas. According to some estimates, about 100 people who died in Gaza are migrant workers from Asian and African countries, and as per the Indian Embassy website, as of February 2023, "There are about 18,000 Indian citizens in Israel, primarily caregivers employed by Israeli elders to take care of them, diamond traders, IT professionals and students."

Relevance: GS Prelims & Mains Paper II; Governance

Source: The Hindu