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Indian Enterprises Battle over Missile System Ownership

New Delhi — A fierce battle has erupted between two state enterprises over ownership of medium- and long-range surface-to-air missile systems that India is developing jointly with Israel.

State enterprises Bharat Dynamics Ltd. (BDL) and Bharat Electronics Ltd. (BEL) each want to be the sole lead integrator, but the Indian Ministry of Defence (MoD) is finding it difficult to pacify the competition, according to a senior defense production official with the ministry, who spoke on condition of anonymity.

State-owned Defence Research and Development Organization (DRDO) is undertaking the joint development of two missiles — the long-range surface-to-air missile (LRSAM) and the medium-range surface-to-air missile (MRSAM) projects with Israel Aerospace Industries (IAI) and Rafael.

For the two missiles programs, IAI and Rafael are the sole design authority and DRDO is only a buyer, according to a senior executive of one of the primary suppliers for the two projects.

"Israel has not given any technology transfer of these two missiles, and the intellectual property rights of the missiles are with IAI and Rafael," he said.

The Indian Navy will procure 12 LRSAM systems at a cost of more than \$2 billion, while the Indian Air Force will buy MRSAM systems including 450 missiles and 18 firing units at a cost of \$2 billion. The Indian Army will purchase the land version of MRSAM, which will include 14 firing units and an unspecified number of missiles at a cost of \$1 billion. With an intercept range of 70 kilometers, the naval version is called LRSAM, while the MRSAM is the Army and Air Force version.

Both missile programs, however, are facing delays — LRSAM was supposed to be inducted in the Indian Navy in 2012 while the MRSAM for the Indian Air Force met a two-year delay, the MoD official said.

"We will conduct one test of MRSAM and two tests of LRSAM in Israel within the next three months; thereafter, two tests of each system will be conducted in India later this year," said an IAI executive, who spoke on condition of anonymity.

Each system will comprise one launcher, which will carry eight missiles, a command-and-control system, and a tracking radar, a DRDO scientist said.

"BDL has already invested over \$100 million to establish a production facility for both MRSAM and LRSAM in Hyderabad, and it will be operational in the next two years," a BDL official said.

The new production facility will produce 100 missiles each year, he said.

However, one BEL executive, who spoke on condition of anonymity, said that BEL will be the lead inheritor for both systems and that the company has teamed with Elta of Israel to license and produce MFSTAR tracking radar in India.

According to an Indian Navy official "The three [defense] services are yet to conduct final user trials. Only then we can access how capable and proven are these systems."

Defence ministry makes private players head of sub-groups to choose strategic partners

By Sushant Singh

In a consultative meeting with industry associations on April 25, Parrikar had discussed the issue of choosing strategic partners, including their selection criteria, before formulating the final policy.

Defence minister Manohar Parrikar has made senior officials of private Indian defence companies heads of five sub-groups to make recommendations on choosing strategic partners in defence. The choice of private defence players and the absence of defence public sector undertakings (DPSUs) from these sub-groups has raised a few eyebrows.

Constituted by the defence ministry on May 24, these sub-groups have to be ready to make their presentations to the defence minister within ten days.

In a consultative meeting with industry associations on April 25, Parrikar had discussed the issue of choosing strategic partners, including their selection criteria, before formulating the final policy. He had decided in that meeting “to have focussed meetings with smaller group for selected platforms”.

The platforms selected for these five sub-groups are: Armoured fighting vehicles (AFV), aircraft and helicopters, submarines, ammunition including smart ammunition, and macro process management of issues. These are consistent with the five platforms recommended by the Aatre committee, except that helicopters and aircraft have been merged in one sub-group, and a separate sub-group created for process management.

Last year, an expert committee headed by former home secretary Dharendra Singh had recommended the strategic partnership model to help build indigenous defence industry. Following that, a task force headed by former DRDO chief, VK Aatre had spelled out the contours of strategic partnership model.

Aatre committee had identified ten domains for strategic partnership in defence production. In each of these domains, a private Indian defence company was to be selected as a strategic partner on the basis of its financial and technical capabilities. A company could become a strategic partner only in one domain, in which it would be assured of all orders for 20 years.

HS Shankar, chairman & MD of Alpha Design Technologies, a company involved with AFVs has been made head of the AFV sub-group. Sukaran Singh, CEO & MD of Tata Advanced Systems Limited, with a stake in the aeroplane manufacturing industry heads the aircraft and helicopters sub-group.

The submarine sub-group is headed by JD Patil, senior VP and head of defence and aerospace at L&T, which already has a substantial presence in submarine industry. Neeraj Gupta, MD of MKU Pvt Ltd, a company producing ammunition heads the ammunition sub-group. The macro-process management sub-group is headed by Rajinder Bhatia of Bharat Forge.

Representatives of DRDO, defence ministry and the concerned defence service are also part of each of the sub-groups, which also have a member of the Aatre committee.

The choice of chairmen of these sub-groups has caused some consternation in industry circles. “If you are going to decide how to select strategic partners, how can you have the interested player head the sub-group to decide whether it can be a strategic partner or not. This is a blatant conflict of interest,” an industry representative told The Indian Express on condition of anonymity.

Even some defence ministry officials are flummoxed by the absence of DPSUs and the short-time given to these sub-groups to respond. “The first notification was issued on May 20, which didn’t name the head of sub-groups. It was given ten days. Then we had this notification with names of head of each sub-group, and it has been given ten days again,” said an official.

A senior defence ministry official, however, clarified that “this is part of a larger consultation process and no final decision can be taken so quickly. Any proposal we make in the ministry will have to go to other ministries for approval.”

The Indian Express
26 May, 2016

Big plans in the air, not much on ground yet

The IAF’s squadron strength has dwindled to dangerously low levels, many jets are near the end of their operational lives, and the future looks uncertain.

With the French Defence Minister having made his government’s best offer, price negotiations with France for 36 Rafale fighters are in their end stages. Earlier this month, the Chief of the Indian Air Force (IAF), Air Chief Marshal Arup Raha, flew in India’s indigenously developed Light Combat Aircraft, Tejas. This was meant to showcase the IAF’s faith in the fighter produced by Hindustan Aeronautics Limited (HAL), which is yet to earn the Final Operational Clearance (FOC). An order for 40 Tejases has been placed by the IAF and the first three fighters are planned to be inducted this year.

But the signing of the Rafale deal and induction of Tejas fighters will not reverse the poor state of the IAF, which has been public knowledge for a few years now. To counter a “two-front collusive threat”, the IAF wants 45 fighter squadrons but has been sanctioned 42 by the government. In March, the Vice Chief of the IAF lamented that they had only 33 squadrons, which were inadequate to fulfill their designated role.

IAF’s Arsenal

Sukhois and Tejases are on their way, and several other aircraft are under consideration to replenish the fighter fleet

WHAT IT HAS*

- MiG-21 Bison: 6 (till 2022)
- MiG-21 M+bis: 3 (till 2018)
- Mig-27 UPG: 2 (till 2018)
- Jaguar: 6 (till 2030)
- Mirage-2000: 3 (till 2030) [below]
- MiG-29: 3 (2030) [above]
- Sukhoi Su-30MKI: 11 (under induction)

WHAT IT IS GETTING

- Sukhoi Su-30MKI: 272 fighters (by 2020)
- Tejas-Mk1: 40 fighters (by 2020)
- Rafale: 36 fighters (by 2023, assuming deal is signed this year)
- Tejas-Mk1A: 80 fighters (by 2028, assuming progress is as planned)

The number of fighter squadrons will dwindle further as 3 squadrons of MiG-21M retire in 2018, along with the 2 squadrons of MiG-27 UPG. The 6 squadrons of MiG-21 Bison will be out of service by 2022.

Of the current fleet, the legacy fighters — 6 squadrons of the Jaguar, 3 of the Mirage-2000 and three of MiG-29 — will last in service till 2030.

How does the IAF plan to make up for the existing shortfall and the forthcoming reductions?

First up is the Tejas. An order for 40 aircraft has been placed with HAL, 20 of which are projected to be in service by mid-2018. By mid-2020, the full complement will be in service and, by then, a HAL official said, possibly more in hope than out of conviction, “the FOC will have come”.

With Defence Minister Manohar Parrikar throwing his weight behind the Tejas, Ministry sources have confirmed that an order for 80 Tejas-Mk1A — an improved version of the aircraft — will be placed with HAL. The prototype of Tejas-Mk1A will be ready by 2018, and HAL hopes to have the Initial Operation Clearance (IOC) by 2020. It can then be put into production on the Tejas assembly line, which would be free.

The workhorse of the IAF will, however, continue to be the Russian Sukhoi MKI. The HAL plant at Nashik produces 12 Sukhois every year, and the IAF expects to have its full complement of 272 Sukhois by 2020. As Parrikar informed Parliament, the serviceability state of Sukhois in service is a worrying 53%.

Assuming the Rafale deal is signed shortly, the 36 fighters will be with the IAF only by 2023. Having only 36 fighters of one type makes little sense logistically or operationally. There was talk of a follow-up deal for more Rafales which could be assembled in India, but this is by no means a certainty.

If — and this is a big if — all goes to plan, the IAF will be able to maintain its current squadron levels. To make up for the shortfall, Parrikar has indicated another imported fighter will be needed. Three are believed to be in contention: US F-16 and F-18, and the Swedish Gripen. Lockheed Martin has proposed shifting the F-16 assembly line to India but it is a previous generation fighter. The F-18 proposal doesn't include an assembly line in India, and the IAF is not too enamoured of it. Sweden has made the right noises about transfer of technology and production of Gripen under 'Make in India'; a formal proposal is expected next month.

Meanwhile, the Russians have been pushing the Fifth Generation Fighter Aircraft (FGFA), which was supposed to be jointly developed by Russia and India. India's lack of interest was apparent from its failure to pay as per schedule. Russia has already developed the fighter with stealth capabilities, and wants India to pay \$ 3.7 billion so that HAL can start producing them in India after its Sukhoi assembly line at Nashik is free.

The FGFA, however, is needed to replace the legacy fighters which will be in service till 2030. By then, should the Defence Ministry commit strongly to the project, the Aeronautical Development Agency's (ADA's) Advanced Medium Combat Aircraft (AMCA) could be poised to enter service. The project needs funding commitment from the government next year, and it hopes to fly the first aircraft in eight years. Another four years will be needed for the IOC.

But all this is still in the planning stage. The reality is that the Rafale deal is yet to be signed while the Tejas-Mk1A is still on paper. The rest, from AMCA to FGFA to another foreign fighter, are also in the realm of the future. The IAF, meanwhile, remains at dangerously low squadron strength, with no clarity about its future.

The Hindustan Times

26 May, 2016

400 more fighter jets in IAF's vision 2030

New Delhi: Grappling with a drawdown of its fighter jet fleet, India has firmed up a plan to plug the capability gap over the next 10 to 15 years. A top defence ministry source said the Indian Air Force was working towards the target of inducting around 400 warplanes by 2030 to buttress its depleting force levels that set off alarm bells about the country's ability to tackle a combined threat from China and Pakistan.

The count of IAF's fighter squadrons has shrunk to 33 (around 640 fighters) compared to a desirable strength of 42. The squadron strength is likely to come down to a mere 19 (around 380 warplanes) by 2027, as revealed in a Parliamentary panel report earlier this month.

The source said the IAF would get 120 Tejas light combat aircraft, another 120 twin-engine medium weight aircraft to be built in India in collaboration with a foreign manufacturer, and an equal number of single-engine fighter planes. India is currently negotiating a deal with France for buying 36 Rafale fighters and 72 Sukhoi-30 fighters are on order. Bridging the capability gap is vital for the IAF that is saddled with ageing Soviet-era fighters.

The IAF also wants to deploy a total of 15 AWACS (airborne warning and control system) over the next decade. The IAF currently operates three Israeli Phalcon AWACS mounted on Russian IL-76 heavy-lift planes. The system has a range of 400km. It is also on course to induct two Brazilian Embraer airborne early warning and control (AEW & C) system aircraft. The AEW & C systems developed by the DRDO are being installed on Embraer-145 jets imported from Brazil.

In March 2015, India took the first step towards developing an indigenous AWACS, with the defence acquisition council giving its go-ahead to a ₹ 5,113 crore project involving mounting two such complex surveillance systems on the European Airbus A330 platform. Airbus Defence & Space was the only bidder for the AWACS India programme, making it the first single vendor project to be cleared by the NDA government.

"The finance ministry has raised some objections but the defence ministry has given a clarification emphasising the operational need for more such platforms," the source said. As per IAF's plans, eight AWACS are required for the eastern border, and five for the western boundary. The IAF wants these monitoring systems to provide 360-degree coverage, which is far more than that offered by (AEW & C) system aircraft.

The Indian Express
26 May, 2016

Chabahar port pact between India, Iran to counter China-Pakistan alliance: report

Prime Minister Narendra Modi visited Iran earlier this week, the first by a Indian Prime Minister in 15 year.

The pact between India and Iran to develop the strategically located Chabahar port, along with the one with Afghanistan on road and rail network, will counter China and Pakistan's alliance in South West Asia, BMI Research said on Wednesday.

"The agreement between India and Iran to develop the latter's port of Chabahar is a major boost for both countries, as well as Afghanistan. In particular, growing co-operation between the three countries will counterbalance China-Pakistan alliance in the geopolitics of South West Asia," it said.

Prime Minister Narendra Modi visited Iran earlier this week, the first by a Indian Prime Minister in 15 year.

A "milestone" pact on the strategic Chabahar Port in southern Iran, which will give India access to Afghanistan and Europe bypassing Pakistan, was among the agreements signed by India and Iran, which also agreed to cooperate on combating radicalism and terror.

Besides the bilateral pact to develop the Chabahar port, for which India will invest USD 500 million, a trilateral Agreement on Transport and Transit Corridor was also signed by India, Afghanistan and Iran, which Modi said could "alter the course of the history of the region".

The bilateral agreements signed by India and Iran after detailed discussions between Modi and President Hassan Rouhani included one on setting up of an aluminium plant and another on laying a railway line to give India access to Afghanistan and Central Asia.

BMI Research, a Fitch Group company, said the governments of India, Iran and Afghanistan have taken a significant step towards closer co-operation by signing an agreement on May 23 to develop Iran's southern port of Chabahar.

"Once the port is developed, it will provide a major boost for Indo-Iranian trade, and also provide a new route for Afghanistan's exports, bypassing Pakistan.

"In particular, the new port at Chabahar is designed to compete with Pakistan's port of Gwadar, which is being developed with Chinese assistance as part of the China-Pakistan Economic Corridor (CPEC)," it added.

CPEC in turn is part of a much bigger Chinese initiative known as 'One Belt One Road' (OBOR), which envisages new land and sea routes connecting China to Western Eurasia and East Africa.

Iran stands to benefit from Chabahar as it will get an enhanced port from which to export more goods to India and the Asia-Pacific region at a time when it is seeking to reintegrate itself into the global economy, BMI Research said.

Iran will also benefit from increased Indian investment. For their part, it seems that Indian firms are seeking to gain first-mover advantage in one of the world's biggest new emerging markets, at a time when Western companies are still hesitant about entering Iran, it said.

India will strengthen its ties with Iran and thus its economic presence in the Gulf region.

In addition, trade to and from Chabahar will allow India to increase commercial influence in Afghanistan, physically bypassing Pakistan, whose generally hostile stance towards India impedes New Delhi's ability to develop ties with Kabul, it added.

India's interests in Afghanistan are mainly focused on challenging Pakistan's position, but India is also interested in tapping Afghanistan's natural resources and those of Central Asia, the agency said.

Afghanistan will get a new trade outlet to the Gulf, Arabian Sea and Indian Ocean bypassing the port of Karachi in Pakistan.

Afghan-Pakistan relations are complex and frequently strained due to Islamabad's past support for the Taliban insurgency in Afghanistan. The Taliban suffered a blow on May 20, when its leader Mullah Akhtar Mansour was killed in a US drone strike, BMI Research said.

Deccan Herald
26 May, 2016

US hopes to ink defence pact with India

Washington: The US is hopeful of concluding a key military logistics agreement with India ahead of Prime Minister Narendra Modi's visit here next month, a top American official has said.

"We are hopeful that progress would be made on some of the foundational agreements including the logistics agreement that might be concluded prior to the (US) visit (of Prime Minister) and we are looking to see if there are other things that we can take on board," Assistant Secretary of State for South and Central Asia Nisha Desai Biswal told members of the Senate Armed Services Committee during a Congressional hearing on India.

Biswal made the remarks while responding to questions on possibility of signing any security agreements between India and the US during the Prime Minister's visit. Biswal said after Defence

Secretary Ashton Carter's recent visit to India, the two countries are moving toward concluding a logistics exchange memorandum of understanding, which would allow the armed forces of the two countries to use each other's bases for resupply and repair.

"We are hopeful that the successful conclusion of this agreement will lead to progress on the remaining foundational agreements and allow greater interoperability in our militaries, so that we can go from joint exercises to coordinated operations in the Indian Ocean," she said on Tuesday.

जनसत्ता

26 मई, 2016

इसरो और यूएई स्पेस एजेंसी के बीच सहमति पत्र पर हस्ताक्षर की मंजूरी

सरकार ने इसरो और यूएई स्पेस एजेंसी (यूएईएसए) के बीच एक सहमति पत्र (एमओयू) पर हस्ताक्षर के लिए बुधवार को मंजूरी प्रदान कर दी।

सरकार ने इसरो और यूएई स्पेस एजेंसी (यूएईएसए) के बीच एक सहमति पत्र (एमओयू) पर हस्ताक्षर के लिए बुधवार को मंजूरी प्रदान कर दी। इस कदम से दोनों एजेंसियों के बीच एक संयुक्त कार्यसमूह की स्थापना का मार्ग प्रशस्त हो सकेगा। साथ ही शांतिपूर्ण उद्देश्यों के लिए बाहरी अंतरिक्ष की खोज के लिए सहयोग में मदद मिल सकेगी। प्रधानमंत्री नरेंद्र मोदी की अध्यक्षता में हुई केंद्रीय कैबिनेट की बैठक में एमओयू पर हस्ताक्षर का फैसला किया गया। इस कदम से शांतिपूर्ण उद्देश्यों के लिए बाहरी अंतरिक्ष की खोज के लिए सहयोग में मदद मिलेगी। खासकर मंगल ग्रह के अध्ययन के क्षेत्र में।

एमओयू से भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) और यूएईएसए के सदस्यों के साथ एक संयुक्त कार्यसमूह का गठन हो सकेगा। जो समयसीमा के साथ कार्ययोजना व इसके कार्यान्वयन के तरीकों को अंतिम रूप देगा। प्रधानमंत्री पिछले साल अगस्त में यूएई गए थे। उनकी यात्रा के दौरान व सितंबर 2015 में भारत-यूएई संयुक्त आर्थिक व तकनीकी सहयोग आयोग की 11वीं बैठक में दोनों देशों के बीच अंतरिक्ष सहयोग को बढ़ावा देने पर जोर दिया गया था। इसरो ने अपने पहले प्रयास में मार्स आर्बिटर मिशन (एमओएम) में सफलता हासिल की, जबकि यूएई ने अपने पहले अंतर-ग्रह अभियान में भारत से सहयोग मांगा है। जो 2020 में शुरू होना निर्धारित है।

कैबिनेट ने भारत और मालदीव के पर्यटन मंत्रालयों के बीच हुए एमओयू को भी पूर्वव्यापी मंजूरी दे दी। इस एमओयू से पर्यटन के क्षेत्र में सहयोग मजबूत होगा। मालदीव के साथ एमओयू इस महत्वपूर्ण स्रोत बाजार से आगमन बढ़ाने में महत्वपूर्ण होगा। हाल के वर्षों में भारत के लिए मालदीव एक प्रमुख पर्यटन बाजार के रूप में उभर कर सामने आया है। सरकार ने भारतीय डाक सेवा की कैडर समीक्षा के प्रस्ताव को भी मंजूर कर लिया। जिसके साथ डाक विभाग कामकाजी जरूरतें पूरी करने और कैडर ढांचे को मजबूत करने में सक्षम होगा।

केंद्रीय मंत्रिमंडल ने भारतीय डाक सेवा की कैडर समीक्षा के प्रस्ताव को पूर्वव्यापी प्रभाव से मंजूरी दे दी। इसमें कहा गया कि इस समीक्षा से विभाग मुख्यालय और क्षेत्र दोनों जगह पर कार्यकारी जरूरतों को पूरा करने और कैडर ढांचे को मजबूत करने में सक्षम होगा। इससे भारतीय डाक सेवा के अधिकारियों के मौजूदा ठहराव को दूर करने और उनके कैरियर की संभावनाओं को सुधारने में भी मदद मिलेगी। कुछ कदम उठाकर प्रस्ताव को लागू किया जाएगा। जिनमें विभिन्न स्तरों पर कई पदों का सृजन शामिल है। हालांकि पदों की कुल संख्या में कोई बदलाव नहीं किया जाएगा।

When the drugs don't work

How to combat the dangerous rise of antibiotic resistance

Some people describe Darwinian evolution as “only a theory”. Try explaining that to the friends and relatives of the 700,000 people killed each year by drug-resistant infections. Resistance to antimicrobial medicines, such as antibiotics and antimalarials, is caused by the survival of the fittest. Unfortunately, fit microbes mean unfit human beings. Drug-resistance is not only one of the clearest examples of evolution in action, it is also the one with the biggest immediate human cost. And it is getting worse. Stretching today's trends out to 2050, the 700,000 deaths could reach 10m.

Cynics might be forgiven for thinking that they have heard this argument before. People have fretted about resistance since antibiotics began being used in large quantities during the late 1940s. Their conclusion that bacterial diseases might again become epidemic as a result has proved false and will remain so. That is because the decline of common 19th-century infections such as tuberculosis and cholera was thanks to better housing, drains and clean water, not penicillin.

The real danger is more subtle—but grave nonetheless. The fact that improvements in public health like those the Victorians pioneered should eventually drive down tuberculosis rates in India hardly makes up for the loss of 60,000 newborn children every year to drug-resistant infections. Wherever there is endemic infection, there is resistance to its treatment. This is true in the rich world, too. Drug-resistant versions of organisms such as *Staphylococcus aureus* are increasing the risk of post-operative infection. The day could come when elective surgery is unwise and organ transplants, which stop rejection with immunosuppression, are downright dangerous. Imagine that everyone in the tropics was vulnerable once again to malaria and that every pin prick could lead to a fatal infection. It is old diseases, not new ones, that need to be feared.

Common failings

The spread of resistance is an example of the tragedy of the commons; the costs of what is being lost are not seen by the people who are responsible. You keep cattle? Add antibiotics to their feed to enhance growth. The cost in terms of increased resistance is borne by society as a whole. You have a sore throat? Take antibiotics in case it is bacterial. If it is viral, and hence untreatable by drugs, no harm done—except to someone else who later catches a resistant infection.

The lack of an incentive to do the right thing is hard to correct. In some health-care systems, doctors are rewarded for writing prescriptions. Patients suffer no immediate harm when they neglect to complete drug courses after their symptoms have cleared up, leaving the most drug-resistant bugs alive. Because many people mistakenly believe that human beings, not bacteria, develop resistance, they do not realise that they are doing anything wrong.

If you cannot easily change behaviour, can you create new drugs instead? Perversely, the market fails here, too. Doctors want to save the best drugs for the hardest cases that are resistant to everything else. It makes no sense to prescribe an expensive patented medicine for the sniffles when something that costs cents will do the job.

Reserving new drugs for emergencies is sensible public policy. But it keeps sales low, and therefore discourages drug firms from research and development. Artemisinin, a malaria treatment which has replaced earlier therapies to which the parasite became resistant—and which now faces resistance problems itself—was brought to the world not by a Western pharmaceutical company, but by Chinese academics.

Sugar the pill

Because antimicrobial resistance has no single solution, it must be fought on many fronts Start with consumption. The use of antibiotics to accelerate growth in farm animals can be banned by agriculture ministries, as it has in the European Union. All the better if governments jointly agree to enforce such rules widely. In both people and animals, policy should be to vaccinate more so as to stop infections before they start. That should appeal to cash-strapped health systems, because prophylaxis is cheaper than treatment. By the same logic, hospitals and other breeding grounds for resistant bugs should prevent infections by practising better hygiene. Governments should educate the public about how antibiotics work and how they can help halt the spread of resistance. Such policies cannot reverse the tragedy of the commons, but they can make it a lot less tragic.

Policy can also sharpen the incentives to innovate. In a declaration in January, 85 pharmaceutical and diagnostic companies pledged to act against drug resistance. The small print reveals that the declaration is, in part, a plea for money. But it also recognises the need for “new commercial models” to encourage innovation by decoupling payments from sales.

That thought is taken up this week in the last of a series of reports commissioned by the British government and the Well come Trust, a medical charity. Among the many recommendations from its author, Jim O’Neill, an economist, is the payment of what he calls “market-entry rewards” to firms that shepherd new antibiotics to the point of usability. This would guarantee prizes of \$800m-1.3 billion for new drugs, on top of revenues from sales.

Another of Lord O’Neill’s suggestions is to expand a basic-research fund set up by the British and Chinese governments in order to sponsor the development of cheap diagnostic techniques. If doctors could tell instantaneously whether an infection was viral or bacterial, they would no longer be tempted to administer antibiotics just in case. If they knew which antibiotics would eradicate an infection, they could avoid prescribing a drug that suffers from partial resistance, and thereby limit the further selection of resistant strains.

Combining policies to accomplish many things at once demands political leadership, but recent global campaigns against HIV/AIDS and malaria show that it is possible. Enough time has been wasted issuing warnings about antibiotic resistance. The moment has come to do something about it. -----©*The Economist*

The Statesman
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Optics breakthrough for better night vision

A team of Australian researchers has demonstrated an optics breakthrough that can revamp night vision by making infra-red technology easy-to-use and cheap.

The team reported a dramatic increase in the absorption efficiency of light in a layer of semiconductor that is only a few hundred atoms thick -- to almost 99 percent light absorption from the current inefficient 7.7 percent.

This can save millions of dollars in defence and other areas using sensing devices, and boost applications of technology to a host of new areas such as agriculture.

Infra-red devices are used for improved vision through fog and for night vision and for observations not possible with visible light.

High-quality detectors cost approximately \$100,000 and some require cooling to -200 degrees Celsius.

The team discovered perfect thin film light absorbers could be created simply by etching grooves into them.

“Conventional absorbers add bulk and cost to the infrared detector as well as the need for continuous power to keep the temperature down. The ultra-thin absorbers can reduce these drawbacks,” said professor Martijn de Sterke, co-author from University of Sydney's school of physics.

By etching thin grooves in the film, the light is directed sideways and almost all of it is absorbed, despite the small amount of material.

There are many applications that could greatly benefit from perfectly absorbing ultra-thin films, ranging from defence and autonomous farming robots to medical tools and consumer electronics. The findings are forthcoming in the journal *Optica*.

The Pioneer
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Threat of Ground-Level Ozone

***Ozone pollution at the ground-level is evolving as a threat to human health and environment.
The Government must conduct an in-depth, research-based study to understand the lacunae
plaguing its pollution-control drive***

Ozone at the stratospheric level is a saviour of sorts as it forms a protective layer against sun's harmful ultraviolet rays. But thanks to increasing levels of pollution in the form of man-made chemicals, this natural protection is gradually diminishing. However, not all ozones are good news. The ozone pollution at the ground-level is a serious cause of concern and is rapidly evolving as a threat to human health and the environment.

The tropospheric, or ground-level ozone is due to the pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources. The chemical reactions between oxides of nitrogen and volatile organic compounds in the presence of sunlight increase ozone levels.

Excess ozone at ground is also a key ingredient in smog and has an adverse and irreversible effect on sensitive vegetation, ecosystems, including forests, parks, wildlife refuges and wilderness areas. But in spite of documented data regarding the effect of ozone pollution on environment, a lot still needs to be done in order to protect delicate ecology from ozone pollution. Ozone impacts, especially on human health, need to be taken much more seriously than it is being done now. Studies indicate that ozone poses risk for people suffering from asthma, children, older adults, and people who are active outdoors, especially outdoor workers. Breathing ozone not only worsens bronchitis and emphysema but also triggers a variety of health problems including chest pain, coughing, throat irritation, and airway inflammation.

It can also reduce lung function and harm lung tissue. In addition, people with certain genetic characteristics and with reduced intake of certain nutrients, such as vitamins C and E, are at greater risk from ozone exposure. Given the wide spectrum of threats to human health, the corresponding awareness level in the community regarding ill effects of ozone pollution on health is not only dismal but puzzling as well. This is indicative of several loopholes still present in the overall community health strategy of the Government. The Government must conduct an in-depth research backed study urgently in order to understand the lacunae plaguing the Government's pollution control drive and how the subject of ozone pollution and its adverse impacts have managed to stay on the fringes of the pollution mitigation strategies. This is crucial since the alarming escalation of ozone pollution is now affecting India's food production and delivering a serious blow to food security strategies.

According to *Geophysical Research Letters*, a journal of the American Geophysical Union, surface ozone pollution damaged six million metric tonnes of India's wheat, rice, soybean and cotton crops. This avoidable damage to crops could have fed 94 million people living below the poverty line.

The absence of a robust ozone pollution mitigation strategy caused this eventuality on food production. However, this can change if the Government is able to productively utilise the Ozone Risk Estimate Database developed by a team of scientists at the Indian Institute of Tropical Meteorology, Pune.

ORED can play a vital role and aid policymakers examine suitable mitigation strategies for crop protection against ozone pollution. According to the scientists, India can enhance its rice yields by 2.5 per cent and wheat by 3.3 per cent if emissions leading to generation of ground-level ozone can be mitigated. The Government must also make efforts to control the urban heat island effect as it has a direct bearing in increasing ozone pollution levels. The urban heat island effect is the phenomenon where developed areas tend to be warmer than their surrounding countryside.

Excessively warm conditions tend to worsen ground-level ozone air pollution problems, as ozone concentrations are dependent on levels of photochemical reactivity affected by temperature. The thermal properties of materials used in urban areas for building and construction play a major role in determining the level of ozone pollution. Therefore, the Government must implement effective building standards that promote use of materials that have low thermal signature. This will mitigate urban heat island phenomenon besides controlling ozone pollution.

A recent study by the World Meteorological Organisation and the United Nations Environment Programme, identified Asia to be vulnerable to ozone pollution. As rising emissions cause severe ozone pollution in some of India's most populated regions, the Government must increase awareness levels in the community. Under the Smart Cities initiative, the Government can adopt technology and develop applications that bring current weather and ozone updates to hand held devices, this will help people track real time ozone levels and plan their outdoor activity accordingly.