

# New Scientist

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## Analysis Space exploration

### Lunar laws of the land The US government is starting to lay down the groundwork for international diplomacy on the moon, says **Leah Crane**

On 15 May, NASA administrator Jim Bridenstine released a set of principles that will govern the Artemis Accords, a series of agreements the US wants to make with other countries to foster cooperation in moon exploration. The accords are named after NASA's Artemis programme, the US initiative to explore the moon, with a planned launch of astronauts to the lunar surface in 2024.

At the moment, there is little practical international law governing lunar activities. The Outer Space Treaty of 1967 deals with general space exploration, while the Moon Agreement of 1984 states that "the moon and its natural resources are the common heritage of all mankind", prohibiting the ownership of any part of the moon or any resources from it.

That sounds pretty conclusive, but no nation capable of human space flight has signed the Moon Agreement, effectively rendering it moot. Last month, US president Donald Trump issued an executive order to support moon mining and take advantage of the natural resources of space.

The Artemis Accords take the same tack. Although protecting historic locations like the Apollo landing sites,

they encourage mining in other areas. They also promote transparency and communication between nations, requiring signatories to share their lunar plans, register any spacecraft sent to orbit or land on the moon and release scientific data to the public.

Transparency might be a stumbling block for potential parties to the accords, says space consultant Laura Forczyk. "I really don't know how much countries are going to

be willing to share some of their more delicate, sensitive information," she says. "But hopefully this is the kind of olive branch that says, 'Hey, we're willing to do this if you are'"

The rest of the stipulations of the Artemis Accords are about safety: nations will be able to set "safety zones" to protect their activities on the moon, they will have to work to mitigate the effects of debris in orbit around the moon and they will agree to provide emergency assistance to any astronauts in distress.

"These are agreements to be a good citizen in space," says space

lawyer Laura Montgomery. "You don't want anybody landing on your lunar habitat and you also don't want rocket plumes kicking up dust and rocks and breaking windows."

Rather than attempting to put together an international treaty, which could be difficult to negotiate before NASA's next crewed launch to the moon, the US will sign accords with individual countries.

Montgomery says this may make the agreements more functional than a blanket treaty where all nations have to ratify the same document. "If you have a robot arm and I have a habitat housing astronauts, we don't need the same information in that agreement," she says.

As international agreements, the Artemis Accords won't apply directly to companies – if they are to follow the rules laid out in the accords, it will have to be through government contracts or the national laws where they operate. For now, most space-flight firms are reliant on government contracts, so it shouldn't be a problem, says Forczyk. Once the agreements are in place, they will represent a step towards having a law of the land on the moon. ■

#### NASA plans to land astronauts on the moon in 2024



## Vaccines

### HPV vaccine linked to fewer premature births in Australia

WIDESPREAD HPV vaccination looks to have prevented thousands of premature births in Australia.

Women who have had HPV, the human papillomavirus that causes genital warts and cervical cancer, are at greater risk of having premature babies. This may be because the treatment for high-risk HPV infections involves removing affected cells from the cervix, which can prevent cancer but may

sometimes affect the mechanical strength of the cervix.

Australia was one of the first countries to introduce a national HPV vaccination programme in 2007, offering free school-based vaccines to girls aged 12 to 13 and a catch-up programme for women aged between 18 and 26.

About 80 per cent of eligible Australian girls have since received the vaccine annually, leading to a sharp decline in HPV infections, genital warts and precancerous cervical lesions. Now, research by Karen Canfell at the Cancer Council NSW in Australia and her colleagues

suggests it has also cut rates of premature births.

Premature births have been steadily climbing in Australia for the past two decades, in line with what has happened in other developed economies, possibly due to reasons such as people having children later in life or IVF conceptions becoming more common.

But using Australian birth data from 2000 to 2015, Canfell's

**"The vaccination programme has probably prevented at least 2000 premature births"**

team has found that women from vaccinated cohorts had 3 per cent fewer premature babies than those from unvaccinated cohorts after adjusting for the age of women and the years they gave birth (*The Journal of Infectious Diseases*, doi.org/dwfn).

The vaccination programme has probably prevented at least 2000 premature births in Australia since it began, says Canfell, although the study couldn't account for some other factors, such as changes in smoking habits or other behaviours. ■

Alice Klein