

A Soviet solar system?

By Andrew Nimmo

On 5th December 1979 the United Nations passed an "Agreement Governing The Activities of States On The Moon And Other Celestial Bodies". Incorporated in the wording were provisions for this "UN Moon Treaty" (as it has come to be called) to become international law for all signatories as soon as at least five nations' governments had ratified it. This means that it would be law for these nations and for any other nation which ratified thereafter, upon ratification. It has now been ratified by Canada, Chile, France, the Philippines and Rumania.

The Agreement commences by pointing out that where it mentions the "Moon", the provisions concerned have to be taken to apply equally to all celestial bodies in the Solar System, except the Earth. The Agreement extends international law to operate throughout the Solar System, bans hostile or threatening military behaviour in space and promotes international co-operation in space activities. It calls for full reports on everything discovered in space and freedom of scientific investigation, warns against introducing harmful space material to the terrestrial environment and specifies what states may do in space localities. It gives a few rules for installing space stations on celestial bodies and for dealing with emergencies and then it comes to Article XI.

This establishes that celestial bodies and their natural resources are all to be considered as belonging equally to everyone, that no single state may ever own or claim any of them, nor may any other inter-governmental or non-governmental entity or person. Paragraph 5 of the article says, "States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploration of the natural resources of the Moon as such exploration is about to become feasible."

You cannot sell anything unless either you or the organisation for whom you work own it

in the first place. Without ownership of property there can therefore be no trade. The implication of this article taken as a whole is that those who retrieve resources from the space locations for the benefit of the citizens of Earth, such as space settlers, will not be permitted to own the house they live in on Mars or wherever, unless every brick has been brought at great expense all the way from Earth. There is of course, perfectly good rock throughout the Solar System which would do just as well, but houses made from it will have to be rented from the international regime - even if built by the space settlers themselves.

Children who may never have seen the Earth other than on TV, will have their activities controlled by an international regime, none of whose members need ever have left the Earth. These children won't be permitted to own anything unless it has been brought from Earth, even if their parents are miners as far away as the satellites of Saturn. Think of the expense of a toy for a little girl who lives on a future terraformed Titan, when the plaything must be brought millions of miles before it can be bought! As space vehicles will probably be manufactured off Earth from asteroid materials, they will be owned by the international regime.

Article XI, paragraph 7 says that one of the main purposes of the Agreement is to establish, "An equitable sharing by all States Parties in the benefits derived from these resources, whereby the interests and needs of the developing countries as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the Moon shall be given special consideration." In the US where the L5 Society (which promotes the settlement of space) has been particularly active in arousing controversy over the Moon Treaty, some lawyers have said that this means that if you find a valuable resource, and by some miracle get permission to mine it, every dollar of profit you make has to be split equally with every member state of the United Nations, and your company will enjoy a small portion of the split-cent which goes to your country. Even if this is exaggerated, there is no way in which the paragraph can be interpreted other than that a

major percentage of profits must be used to benefit the poor in faraway countries. This may seem very laudable, but there are other ways to help the poor than by robbing the rich to the extent that they become poor also. This kills all incentive for any space work by any private organisation, and by anyone else too. What government would back a space mining project the bulk of the profit from which must by law be given to other countries?

MOSCOW'S EMPIRE

As this treaty was initially proposed by the Soviet Union and it was reported that the Russians had invited the nations of Earth to congregate in Moscow in 1982 for the purpose of setting-up the international regime, it has been widely assumed that the whole thing is a Russian imperialist scheme to take over the Solar System. How would you like to see an Empire of Earth encompassing the whole of the Solar System, with its headquarters in Moscow banning all private property everywhere except on Earth, so that the vast wealth of our Solar System becomes an almost exclusive preserve of the Russian state or its stooges? While neither have yet ratified the treaty, by agreeing to it in the UN it seems that both US and UK have agreed in principle to just this. The Russian argument runs that as communism is in the best interests of mankind as a whole, there would be no breach of the Agreement in utilising Space resources towards expansion of Communist influence on Earth.

Luckily the Russians themselves appear to be cooling considerably, as it is becoming plain that the Third World sees things in a very different light. In 1978 a Sri Lankan government spokesman stated: "The common heritage of mankind is the common property of mankind. The commonness of the 'common heritage' is a commonness of ownership and benefit. The minerals are owned by your country and mine, and by all the rest as well... If you touch in any way, you touch my property. If you take them away, you take away my property." This refers to the controversial Article XI, which commences with words inserted not by the Russians, but by the Americans who plainly didn't understand the implications: "The Moon and its natural resources are the

common heritage of mankind which finds its expression in the provisions of this Agreement and in particular in paragraph 5 of this article." Many other Third World nations have indicated similar views, and all demand one-nation one-vote in the international regime.

The Russians seem to have a choice between continuing to curry favour with the Third World and forgetting space exploitation, or of going ahead in Space and forgetting the Third World. Any other choice would be uneconomic. The Soviet economy is wobbling as it is. They couldn't possibly afford to go to space and then give away over 99% of the profit. If they wish to keep in with the Third World and export communism to it the effect of the treaty will be to stop all their space plans other than those dealing purely with Earth-orbit satellites. At present, this is precisely what they appear to be doing, but much of their present work looks preparatory to deeper Space ventures later.

At present it seems that the Russians are waiting to see what the Americans do. They have indicated that if the US sign they will sign. If the US signed and the Russians refused they would lose credibility as champions of the Third World, so they would have little option. In the US, confusion reigns supreme.

OPPOSITION TO THE TREATY

Some large companies have gone to the extent of taking prominent advertising space in papers such as the *Washington Evening Post* to oppose the treaty. But there are others such as space law expert Edward R. Finch who believe all the Treaty needs is a few additional paragraphs tacked on by the US government, and still many more who don't think it really matters because 'everyone knows there's nothing up there anyway!' This last group appears to include Senators and scientists as well as laymen, and may well be the most powerful group of the three.

So mixed-up is the reaction that bodies such as the *American Bar Association* and the *American Institute of Aeronautics and Astronautics* are unable to make up their

minds one way or the other. Supporters of the treaty and some opponents argue that we will need some law to govern our expansion into space localities. Other space law experts such as Arthur M. Dula demolish Finch's argument by pointing to the Vienna Convention on International Treaties, which rules that no matter what attachments are added by individual nations to international treaties, only the agreed treaty itself becomes international law, so that any additional 'understandings' would be just so much wasted time and paper.

The main opponents of the treaty in the US have been the L5 Society and Omni, both of which campaigned ceaselessly and finally managed at least to persuade Carter to hand the treaty over to a large committee. Reagan's election may change things.

SPACE LAW

Before considering what may happen in the future however, it might be worthwhile taking a look at the history of space law. Believe it or not, this goes back to the days of the Roman Empire. As Arthur M. Dula points out in an excellent article on the subject in *Contemporary Business* 'Cujus est solum ejus usque ad coelum' - whose is the soil, his it is up to sky - the ancient Roman law of property was where it all began. Even today many nations have no law defining where the sky begins.

Until the Russians changed things by launching Sputnik 1, courts around the world generally assumed that any landowner owned everything above his land to infinity. The advent of space travel made governments aware of a new field in which they could make law, and the advent of spy satellites put urgency on this.

A draft UN "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and other Celestial Bodies" called for a ban on private enterprise in space, and provided that all space activities should be carried out by states. In view of COMSAT, the Communications Satellite Corporation, set up in defiance of the treaty while it was being discussed, the wording was amended to permit private enterprise in space, though

only under government supervision. This "Treaty on Principles" was passed in 1966 and has been ratified by over 100 countries. It says that the exploration and use of space shall be for the benefit of all mankind and states, irrespective of their level of economic or scientific development. It prohibits claims of appropriation by any means including occupation, bans nuclear weapons in space, makes provision for the return of astronauts who accidentally land in the wrong territory, makes states responsible for the actions of their citizens in space and insists on government supervision of non-governmental entities in space. It makes states liable for damage done by either their spacecraft or any launched from their territory, extends the ownership of space vehicles by their states to incorporate continued ownership in space, demands international conferences before any interference by craft of one state with any of another, and insists that all space installations be open to international inspection.

That treaty was the first UN space treaty, but it has not been the last. In 1968 the "Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space" was signed, and this was followed by the "Convention on International Liability for Damage Caused by Space Objects" in 1972. Only states may make claims. Individuals and companies have no legal claim for damage caused by stray space objects launched by citizens of countries other than their own, unless they can persuade their own government to make the claim for them.

In the mid-1970s the Third World got into the act. A group of nations including Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda, and Zaire signed the "Declaration of Bogota" in 1976. This ignored the 'Treaty on Principles' and laid claim to the orbit which lies 22,300 miles above the equator, "stationary orbit, which they claimed on the grounds that the orbit passed over their territories. Both the US and the Soviet Union denounced this reminding everyone of the 1967 treaty.

Also in 1976 the UN passed the "Convention on Registration of Objects launched into

Outer Space”, which provided that when a nation or its citizens launch a space object, that nation should register the object, where after that nation’s law will be deemed to pertain to that object. For example, if space settlement was permitted and the US launched a settlement, those who lived in it would be obliged to live by US law. Similarly, if the UK launched a settlement its inhabitants would be obliged to live by UK law.

Another Third World group, calling themselves the “Group of 77” published a declaration demanding a “New International Economic Order” which required that those who receive raw materials and natural resources which aid industrial economies must pay a significant share of their wealth in exchange for access to those resources, and postulated the “common heritage” concept for the first time. As Ben Bova says in his article in the December *Omni*, “a consortium of Third World nations, seeing the success of OPEC in escalating petroleum prices, decided to try the same tactics on resources which they neither owned nor had any chance of controlling.”

In 1970 the legal subcommittee of the UN committee for the Peaceful Use of Outer Space received a submission from Argentina which proposed a special treaty to cover the Moon and other celestial bodies. The US, India and Egypt supported this, but in 1971 the USSR submitted a draft of its own treaty. This was the beginning of the present UN Moon Treaty. For years the nations argued back and forth before the US and UK got involved with the Russians in SALT II talks. Apparently wanting to give the Russians a present to get them to agree to something, and ‘believing space was worthless anyway, in June of 1979 they gave way on the Moon Treaty and agreement was reached in the UN on the 3rd of July when the treaty was passed to the Assembly. On the 4th, the L5 Society started the campaign against it and on the 5th the Assembly passed it out to the nations for ratification.

It was at the point where the treaty was passed to the Assembly however, that the campaign against it got going in the American media. British news media have so far not taken this up. The implications of communications satellites, weather satellites,

spin-offs from the space programme and other Earth-orientated space subjects have been very well covered, but there is a general feeling that the concepts of space mining or space settlement as such are really matters for the far future, and need not concern us now. Indeed, what does it matter if the Russians or the Third World do control the Solar System if they can’t afford to go there anyway? And is there anything there which would even make it worth their while to try?

SPACE TRAVEL CHEAPER

The cost of spaceflight has been its biggest drawback. 1981 should see the first launch of the US Space Shuttle, a vehicle which can be used over and over again. Naturally this will bring down the cost considerably. As with most large aerospace projects, due to problems and delays the Shuttle will cost much more than originally estimated, but it will still bring down the over-all cost of spaceflight by almost a factor of 10, and Europe’s own “Ariane” rocket, in spite of a much publicised failure last May, is well on the way to becoming operational and will cost even less than the Shuttle. This is because Europe has been able to capitalise on research already done by the Americans and widely published, and hasn’t had to spend nearly as much on the basic research side as the Americans had to with their rockets. It is true that the Shuttle will only go up to low orbit, but deeper space vehicles can be taken up in it piggy-back and launched once in space, and the Ariane can go all the way up to geosynchronous orbit under her own steam.

There are also other vehicles in the pipeline. Research is going on now in the US on ‘light-sails’, a propulsion system similar to our ancient terrestrial sailing ships on the sea. It has been discovered that certain types of plastic material can be made so thin, that when coated with a very fine layer of a reflective substance such as aluminium, the material can actually be propelled by as weak a force as the pressure of light. Vehicles propelled in this manner would sail away from a light-source, or by changing the angles of the sail material, could be made to tack towards it like a yacht. Erie Drexler, a post-graduate student at the Massachusetts Institute of Technology, has actually

manufactured specimens of this material and demonstrated it to the satisfaction of the NASA scientists at the Jet Propulsion Laboratory in California. Vehicles propelled in this manner would of course, move very slowly at first, but as there is plenty of light in our Solar System, and as it would exert constant pressure, the vehicles would be capable of constant acceleration. This is quite different from a rocket which gives its all in a few minutes and then coasts. It has been calculated that as a result, a light-sail vehicle could cover a similar distance in three months, to that which could take a rocket-propelled vehicle three years! Further, once in space, the vehicle would use the Sun's or the Earth's or the Moon's light, or that of the nearest planet or satellite, so it wouldn't have to carry any fuel and its flight would cost little more than the salaries of any spacemen it happened to be carrying.

The cost of getting up there however, is the main cost of space-flight, as rockets coast most of the time once up there. This cost is precisely the one which the Shuttle and Ariane are bringing down. Coupled with light-sail vehicles though, long-distance space ventures would certainly be cheaper. If there is anything worthwhile out there and light-sails are developed fairly soon, whatever it is could be brought back at a reasonable cost. However, there is still the problem of distribution of the resources brought back once they get here. What is required if space resources are really going to help improve our world situation, is a space vehicle which can land at any ordinary airport anywhere rather than something like the Shuttle which can only land at about two locations even in the US.

Such a vehicle is also on the cards. In the early 1960s Professor T.R.F. Nonweiler of Glasgow University drew up plans for a new type of space vehicle, the waverider. By paying attention to the principles of topology, he was able to design a vehicle which, owing to its shape, could enter the atmosphere from space at such an angle as to capture the shock-wave of entry underneath it and then use this as a brake, whereby the whole vehicle would be slowed down to land at speeds more like those of a car than a plane. In this way it would be enabled to land on any airport in the world.

THE PICKINGS IN SPACE

What is up there to make the Moon Treaty and all this space research matter? Why go to space in the first place? Is it just for adventure and a few nifty gadgets in Earth-orbit?

Most asteroids inhabit what is called the 'Asteroid Belt', between Mars and Jupiter, but there are quite a few which come considerably closer. About 50 approach the Earth every few years, usually at regular intervals which vary from asteroid to asteroid. According to spectrum analysis one of these, Ra-Shalom, appears to be about 10% water. It has a good quantity of biologically advantageous nitrogen, and the rest is mainly an oil-like sludge which would probably be very useful in many ways. There are quite enough of the right chemicals here to power many hundred, possibly thousands of waverider flights, and to grow food for space settlers as well.

Another asteroid which passes close to the Earth is Eros. This, according to spectrum analysis, has about a million million tons of iron, a hundred thousand million tons of nickel, fifty-six thousand million tons of chrome, twenty million tons of platinum, and silicon, oxygen, magnesium, sulphur, aluminium, calcium, and possibly cobalt, copper and gold as well. It has been estimated that this one asteroid is worth more than the entire GNP of the US, or the total joint GNPs of the EEC member states. Both Ra-Shalom and Eros are medium sized asteroids about 20 miles across, and Eros is appropriately shaped like a carrot!

If asteroids generally follow similar proportions to meteorites found on Earth about 1% should be of the carbonaceous type like Ra-Shalom, -that is still a very large number of asteroids - and many of the rest will be like Eros. Out on the Belt, there are about 100,000 asteroids, around 3,100 of which range from about 1/3 of a mile to 500 miles across, and the rest are nice sized chunks just waiting to be picked up and processed. There is enough material to last man for centuries.

By use of the fifty or so asteroids which pass close to Earth as a resource upon which to

base a first foothold in space localities, and to refurbish the later expeditions' light-ships sailing to the Belt, it is inevitable that a great human civilisation will develop out beyond Mars.

Professor Gerard K. O'Neill has shown how with present day technology, giant twenty-mile long cylindrical satellites can be built, each containing three two-mile wide strips of land and each with an identical twin, both spinning in opposite directions to provide artificial gravity. Each of these twin complexes could support ten million inhabitants living in Earth-like conditions. The sky inside would be four miles up, similar to the depth of the Earth's atmosphere. It would be blue and contain clouds. There would be hills, even mountains, rivers, lakes, trees, grass, flowers, birds, bees, domestic animals, etc., just as on Earth. The inhabitants would have no claustrophobic feeling of living in a tin cylinder, like present day astronauts might be imagined to have. By using material from just the three largest asteroids alone, such cylinders could be built containing a combined total internal surface area three thousand times that of our entire Earth's present land surface area. Enough solar power can be collected to power such satellites even as far away as Saturn, so there would be no problem at the Asteroid Belt.

Campaigns to commence building such satellites in proximity to Earth are already under way in the US, and many prominent scientists support these. Major investigations have recently taken place by such organisations as the US Department of Energy and NASA, on the subject of diverting solar energy from space to power cities on earth, and many of these have incorporated O'Neill-type satellites to house the work-force who would build the giant power-stations in the sky. These power-stations themselves will cost six times more to build from Earth materials than they would were they to be built using Lunar materials, in energy terms and energy is one of the most costly items on the bill. This is quite simply because from Earth the materials have to be carted up against six times the Moon's gravity. To build them from the cheaper Lunar materials though,

will not be possible for any nation which ratifies the UN Moon Treaty.

In 1982 the University of Utah plans to test the first light-sail vehicles in space. The World Space Foundation has similar plans for larger vehicles around 1984 or 1985, and at the same time CNES, the French National Space Agency plans to hold a light-sail race to the Moon and back – invitations have already gone out. I have one on my desk as I type this. The main point of developing the light-sail however, is as a work-horse of space. What is the purpose of all this if the UN Moon Treaty is ratified?

The whole scenario I have been describing can get under way within ten years from now, certainly within twenty. As one space entrepreneur said recently, "It's raining soup, grab a bucket!" If space is opened up even the poorest of us will have the opportunity to become fabulously wealthy by today's standards. There is far more than enough wealth up there for all, and once waveriders and light-sails are both working to bring it back there will be no excuse for being poor for anyone. None of this will happen if the UN Moon Treaty is enforced.

What then will Reagan do? Traditionally, one of the first foreign policy actions of new US Presidents is to consult their West European allies. Many UK citizens like to think there's a special relationship between the US and UK, and to some extent this is true. We do both speak the same language, but there is also a special relationship between the US and France who did after all, give some support to the States in their War of Independence with the UK, and naturally there is a special relationship between the US and Canada, next door, and both France and Canada have ratified the treaty!

The position of the UK on the treaty therefore now becomes uniquely important. This importance is underlined when it is noted that throughout the whole of Reagan's election campaign, space was mentioned only once. Many space activists in the US are of the opinion that neither he nor his advisors really know anything about it. If anything, his administration looks like being in the third of our three camps on this one,

neither against nor in favour, but not really understanding why it should matter.

What then is the UK's position on the UN Moon Treaty? The issue of the US publication "Commercial Space Report" dated Wednesday August 1, 1979, first alerted space activists here as to what was happening. Patrick Callins, a member of the European Space Promotion Society whose work for Imperial College, London, and ESTEC in Holland involves the economics of spaceflight, wrote to the Prime Minister alerting her to the dangers of signing, and calling for LJK opposition to the treaty in the UN General Assembly. Nicholas Ridley MP, replying for the Prime Minister, indicated that Her Majesty's Government couldn't see anything wrong with the treaty!

Patrick sent copies of both his letter and the reply to me, as at that time I was President of ESPS. In turn I took both along with a collection of other data on the subject to the House of Commons where I had a meeting with our Honorary Chairman of the time, David Atkinson MP, who agreed on the importance of the matter and he proceeded to plan the launching of a new Parliamentary Committee to deal with spaceflight. This was done on 1st May 1980 when Professor Bin Cheng of University College, London, an expert on space law, came to Parliament to address the first meeting of the LJK Parliamentary 'All Party Space Committee'.

In spite of considerable publicity both inside and outside the House, the 'All Party Space Committee' first meeting was very poorly attended, though in concert with a report from the Council of Europe on communications satellites, and one or two other matters, it did help provoke considerable discussion on space topics in parliamentary circles. Shortly thereafter, the British Interplanetary Society published the treaty in full in their magazine, 'Spaceflight', with fairly neutral comment which nevertheless indicated that we did need some law and this would probably do as well as any.

Thatcher ended the parliamentary discussion by asking the UK government Think Tank to review the whole of UK space policy, and to report back to her in the autumn, and by

promising a major policy statement on spaceflight in the near future. It is thought that this may be an announcement regarding a UK communications satellite programme rather than anything to do with the Moon Treaty. It seems that, like the Russians, Britain is waiting to see what the Americans do.

In the circumstances Reagan is likely to listen to others. These will be the L5 Society, Omni and other US lobbyists such as the libertarian *Reason* magazine, urging him not to sign, and prominent Senators and major nations such as France and Canada urging him to do so. It seems that in these circumstances the best that can be hoped for is a signing with 'understandings' attached as Finch proposed, no matter how meaningless the understandings are in international law. If on the other hand, Thatcher were to make up her own mind rather than waiting for Reagan's advice, and Britain were to take a stand against the treaty and advise the US firmly of that fact, there is little doubt that America would listen. Reagan's and Thatcher's own political outlooks are totally opposed to what the treaty stands for. The only reason it is liable to be ratified by their governments is simply that they haven't paid it proper attention and genuinely don't understand its implications.

In July 1980 two new societies were formed: the Free Space Society, to promote private enterprise space ventures and to oppose the UN Moon Treaty in every way possible, and the Space Settlers' Society, to raise funds for migration into space in defiance of the treaty, even if it takes twenty years or more. The New Moon Treaty has been introduced as a discussion document in the form of an alternative treaty which would both provide incentive to solve the problems of the Third World and provide the settlers with control over their own activities. A Free Space Convention will be held from 27th June to 4th July 1981, in the Barbican in London, at which organisations and individuals genuinely interested in a future for humankind may draw up their own alternative treaty to the UN Moon Treaty. Chairman of the Free Space Society is Ben Bova and Vice-Chairman is the MP, David Atkinson. Membership is currently 615. Members of the Executive are: George Hay

The Libertarian Alliance is an independent, non-party group, with a shared desire to work for a free society.

(President), author and editor; Jeff Rosson (Vice-President), freelance writer and Chairman of the Barbican Community Association; Andre Metaxides (Vice President), a young property entrepreneur; and myself (General Secretary). Today, the only group actively opposing the UN Moon Treaty in the UK is the Free Space Society.