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INNOVATION LETTER

THE REGULATORY ODYSSEY: NAVIGATING THE UNCHARTED REALM OF SPACE INNOVATION

Abstract
The human capacity of imaging has brought human beings in Space; human knowledge must now understand whether, and how to frame a better relationship between our planet and "what is beyond". Therefore, technicians and legislators/ regulators at all level must act in synergy. The former shall guide the latter on what is feasible and what should be done to get effective results that will benefit all.

JEL CLASSIFICATION: O30, Y20

It took several millennia for Humanity to be able to lift off the ground by just a few meters with a vehicle that was heavier than air: it was the first aeroplane type. That historic flight of the Wright brothers happened in 1903 and from there, the curve of conquest was steep: only 16 years later we were able to fly across an ocean and 50 years after that we managed to send the people to the Moon which is some 400.000 km away.

Today we can connect any two points of the Earth with flights that are available to anyone at low-cost fares and almost everything of what we do in our daily life, from the moment we wake up depends on thousands of satellites orbiting our planet at speeds that are in the order of the kilometres per second (km/s).

That posted picture that we check with the morning coffee of our friend's tropical holidays is nothing more than a string of bytes that has most likely travelled halfway around the world in an instant while being relayed by a few satellites. Then we might check the weather to decide what to wear and we don't realise that having that precise forecast is only thanks to satellites that constantly measure our atmosphere and provide data for the meteorology. Once we step out of the door we ask our mobiles to give us directions to get to work: the very map that we are looking at has been drawn and is

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constantly updated thanks to mapping satellites and our devices can understand exactly where on that map we are thanks to the GNSS (Global Navigation Satellite System) which is composed by many constellations of satellites that can cover with their radio signals the entire planet and allow our devices to calculate in an instant the relative position with respect to some of them and therefore the absolute position on the Earth, very similar to what sailors used to do with lighthouses, but this time with a precision that can go down the centimetre and in the pocket of every one of us, just one lock screen away.

This list could go on and on, but I would stop at the first couple of hours of our day because I think that the concept is clear: our society already depends in an irreversible way on so-called “space technology”, and this is not only at the state or big companies’ level, but it really gets down to the individual with tools that we give for granted and are very cheap and available to everyone; thus the importance of understating and regulating this “space technology”.

On top of the very intense use of space that we already do, there are missions that only belonged to science fiction up to a couple of decades ago and they are now a real possibility for the near future: I’m referring here to concepts like human exploration of other planets or being able to exploit resources on extra-terrestrial bodies. Those kinds of missions do open the need for regulations that are driven by problems that humankind might have never encountered before, and they require the regulatory bodies to be up to speed with the exponential growth of the technological means available.

However, even when staying more “down to Earth” there are already many complex regulatory issues that are not completely solved and are vital for this industry's prosperous and safe continuation. The matter of space debris is one very relevant example: all the thousands of satellites that we previously mentioned, will eventually come to the end of their life. The satellite will stop functioning and therefore stop providing that service that it was built for, however, the satellite itself, depending on the characteristics of its orbit, will keep orbiting the Earth, without control, for centuries and in some cases even indefinitely, thus causing danger for all future missions.

It is a fact that currently, a collision at orbiting speeds with even the smallest of the screws coming from a disintegrating satellite could be devastating for any spacecraft, avoidance manoeuvres are extremely complicated and expensive and even more complicated, if not impossible, are missions to go and collect debris. Here is the importance of binding satellites manufacturers at including de-orbiting strategies and devices in the design phase, so that the object will remove itself from the orbit at decommissioning and either burn in the atmosphere or be placed on a “graveyard orbit” that can’t cause any harm. The tracking and the orbit determination of all the man-made objects that are already tumbling around the Earth and will never be removed is also of vital importance and it is a task for the most powerful and expensive telescopes.

And all this happens because it was tailored that way. Would it be (technologically) feasible to change its course? At which stage is the technological innovation?

Those are some of the practical questions a technician, as I am, could raise when thinking about "the space industry".

The question is pressing; the human capacity of imaging has so far led the human being in space; human knowledge must now understand whether and how to better define a relationship between our planet and what there is beyond. The premise is this following: being able to expand our presence to a tiny (for now) portion of the space in our solar system is a privilege that humanity has been able to gain only with the combination of efforts of the most brilliant minds in many different scientific fields that solved very complex problems and keep solving the ones ahead; the present is that we have reached a point were space technology could only proceed if this effort is expanded and different kind of expertise are involved such as lawyers and regulators. The present future is this one: The ambitious law expert that will venture into space law research needs an open mind that can tackle issues that don't find any precedent in the literature combined with the willingness to study and understand the basic physics principles that govern space flight.

In practice, technicians must be collateral and legislators, at all levels, must act in synergy. The former shall guide the latter on what is feasible and what should be done in order to get effective results that will be of benefit to all.