[3]: Sputnik One

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For those of you unfamiliar with pre-2050's history, on the fourth of October 1957, the Soviet Union, a large socialist alliance of former republics, launched Sputnik One, the first man-made, artificial satellite into orbit around the Earth. By doing so, the Soviet Union triggered a combined space and nuclear arms race that would transform the fate of global history. The cold war, between the western block countries such as the United States of America and its NATO allies, and the eastern block countries such as Russia and the wider Soviet Union states, became a significant issue in the post second world war years. Despite all this, the period was characterised by significant investment in technologies benefiting both the military and scientific domains.

The launch of Sputnik One propagated a general mood, becoming known within the American political institutions and hence within the wider military and pubic spheres, as the "Sputnik Crisis". This was a period of significant fear, anxiety and military and political posturing. It may seem significant, that while such societal reaction can only be described as huge and remarkable, Sputnik One was in fact quite passive. While on paper this small 58cm polished, silver sphere was described as an Earth observation satellite, and hence suggests the image and paranoid delusions of being spied upon and tracked, it included no sensors of any kind, and was powered by only short-lived batteries.

Sputnik One transmitted short radio pulses at both 20.005 and 40.002MHz. These signals emanated from four rear facing radio antennae protruding at a 30-degree angle from an equatorial belt around the centre of the satellite. Earth observation was achieved by tracking and measuring the received radio

signals as Sputnik orbited at a speed of some 8,100m/s producing an orbit time of 92.6 minutes. The frequencies of transmission, were placed directly within the electromagnetic range suitable, at the time, for even amateur radio operators. Hence the political fallout of Sputniks launch was strangely contrasted by the openness of the satellites designers. Indeed, if one is to follow the line of logic culminating in the publics fears of being spied upon, and the degree of military anxiety, one would assume that some form of non-amateur, predominantly military and well encoded transmission would be implied. While the politicians and military personnel of the day were right to their degree of concern, from a scientific viewpoint one must start somewhere. Indeed, the success of Sputnik One lead quickly onto other Soviet Union, and by proxy United States, satellites and eventually manned missions. The long fabled manned exploration of the moon was a direct consequence of these early Union of Soviet Socialist Republics (USSR) scientific endeavours.

Sputnik One could observe two predominant phenomena. From its drag through the atmosphere of its elliptical low-earth orbit, an altitude range between 160km and 2,000km, the spatial distribution of upper atmosphere density could be calculated. Military strategists within the western powers perceived this as a scientific prelude and required knowledge for long-range missiles and the development of space-born weaponry. Certainly, the scientific fiction of the day took such ideas to heart, although the propensity was for authors to concentrate on Martian attacks and other non-Earth political issues. Sputniks dual frequency, and controlled time interval radio pulses (0.3s 50% duty cycle pulses) allowed the study of radio propagation, again in a global spatial mode, within the ionosphere. Quite rightly, the US viewed this as scientific research necessary to control and communicate with advanced military hardware and weaponry, and hence a significant issue of national security. At the time, some speculated that the openness of the two frequencies and the use of simple pulsed modulation was a direct non-verbal provocation. In effect, they speculated that the USSR was gloating and indeed goading the western powers after the American publics perception of being a military and technological super-power had been dashed.

Towards the end of October 1957, it became clear that Sputniks radio transmitter batteries were running down. This was found as the normal time interleaving of pulses on the two frequencies became irregular and sluggish.

After twenty-one days of radio transmission, and hence twenty-one days of earth observation, Sputnik Ones last radio pulse was at 2.06am Greenwich mean time on the 26th of October 1957. Towards this date extra atmospheric drag was evident, although this could not be computed due to the inability to separate the effect from the radio-pulse timing drift caused by the decreasing battery charge. As Sputnik was observable from Earth, optical telemetry was used to track it until on the 4th of January 1958, it was assumed to have burnt up while re-entering Earths atmosphere. Indeed, below an orbit of 160km, approximately equal to the drag experienced by Sputnik as modelled taking into account the estimated run-down of the transmitter batteries, all orbiting objects experience a rapid orbital decay.

In the approximately one hundred and twenty years since the launch of Sputnik One, the number of artificial satellites, manned missions, and orbital habitation and research platforms has increased exponentially. For the most part Skylab, MIR, the International Space Station (ISS) and the many other man-made structures within orbit, have been successful and have also all experienced orbital decay and eventual destruction as atmospheric friction heats these falling, high-speed objects above the boiling points of most metals.

Until 2083, it was therefore assumed that Sputnik has indeed been destroyed, an assumption evidenced by multiple optical tracking observatories at the time, and the simple fact that no space-based mission since 1958 had observed it. We now know however that Sputnik One was not destroyed, or at least there is some highly advanced replica of it in orbit.

As of the nineteenth of March 2083, the International Space Research Orbital (ISRO) made radio contact with an artificial intelligence calling itself CLEO. In a highly improbable manner, this contact was made at exactly zero-hundred hours universal standard time. It quickly became evident that this entity was in an orbital some 45km lower than ISRO. As no space-faring nation or commercial company took ownership of this entity, it was decided at 02:30 that the ISROs orbit would be decreased to achieve approximate synchronicity with the entity. As the orbital phase between the entity and ISRO decreased, optical observation identified the entity as Sputnik One, or rather some object with remarkable resemblance to this historic craft. Radio observation identified two predominant radio frequencies, 20.005 and

40.002MHz exactly matching the design parameters of Sputnik One from the pages of history. The entity calling itself CLEO made no further response to ISRO staffs radio transmissions. At 05:12, ISRO initiated a short burn allowing the entity to be captured by ISROs primary robotic manipulation arm. At 05:30, the approximate time a physical human would have had the opportunity to inspect the entity, all contact was lost with ISRO.

While mission control attempted to re-establish contact with ISRO, it wasnt until 19:34 that communications returned from this blackout. Evidently, it was not the actions of mission control that propagated this re-establishment of communications, rather it was a single ISRO officer. The combined video and data burst, was highly concerning for both the civilian overseers of the ISRO mission and its military and governmental advisers. Indeed, pre-emptively, Space X, had launched a five-man team into orbit at approximately fourteen hundred hours, although it would be several hours before altitude and orbital phase could be synchronised on order to dock with ISRO. At 20:34, after a full hour debrief by Dr James Hunter aboard ISRO, communications again went dark. This was against the express orders of the missions control centre, prompting wide spread speculation as to Hunters mental state, although his spoken word, professionalism and technical coherence throughout most of the debriefing seemed to counter such speculations. In response, the Space X team was ordered to do its best to speed up orbital synchronisation and docking procedures.

Wading through the significant volumes of data transmitted by Hunter, guided by his own debriefing on the matter, it became clear that this object or entity calling itself CLEO, was not the original Sputnik One. Despite all external appearances, it had been modified internally. The crucial questions were how has it had been changed, what purpose did these modifications have and by whom had it been modified?

The data transmitted by Hunter was comprehensive to say the least, and mission control were unable to fault his scientific robustness, his military precision and the engineering prowess of his technical investigation. It was clear that the outer-shell of this supposed Sputnik One was indeed authentic. A mass spectrum analysis of the outer structure revealed the same heat shield material as the original design, namely an aluminium-magnesium-titanium alloy with exactly 6% magnesium and 0.2% titanium. Further, the alloy was

identified as being from the same batch of so-called AMG6T alloy as the original sputnik through carbon dating of the alloys trace carbon content. The outer structure was measured to be 585 mm in diameter and 83.6Kg. This matched the dimensions of the original launched satellite exactly. Well within the recorded accuracy of measurements in the late 1950's. Internally, Hunter had found the same chemical battery as used by the original, and the decay of the anode and cathode electrodes and the degradation of the central electrolyte matched those expected for chemical technologies of the era.

Hunter reported however that the entity calling itself CLEO had been strangely forthcoming with allowing him access to the internal structure of Sputnik One. Indeed, quite to his surprise, the AI had described the function of certain sub-systems within the structure. Quite clearly, and evidenced by Hunters photographs, the technology within the sphere was only superficially similar to that of the 1950's. Hunter described the older components as originals but with an air of being a faade. Evidently new technology, seemed instead to be in line with what we would expect with another twenty years of progress on top of our currently technology, Hunter describe these as near-futurist and what he would expect for the year 2100. While this was perhaps subjective and a function of his exposure to technological trends, it came as a distinct concern for advisers at ISRO mission headquarters.

Hunter went on to describe both his own observations and his conversation with the entity CLEO. Obviously, this version of Sputnik One had many new observation abilities. No longer was it just a passive satellite where Earth observation was a product of by-proxy experimentation of atmospheric drag and radio propagation. In a manner vaguely reminiscent of the openness of Russian and Soviet Union engineers with respect to the radio transmission frequencies chosen, CLEO instructed Hunter on the new abilities of Sputnik One.

This new technology included in Sputnik One, which somehow had not contributed to the mass of the satellite, had been design to simultaneously record all radio transmission from earth, from the low KHz AM bands to the high GHz and military bands. CLEO was also forthcoming in elucidating the degree at which it could intercept all microwave modulated satellite communications bands, and through observation of angular scatter of photons in the atmosphere could intercept any optical line-of-site communications whether

this be between an Earth-based ground station and an orbiting satellite or between two Earth-based transceivers.

At Hunters request, CLEO had initiated a high bandwidth dump of all human and machine-to-machine internet traffic. Evidenced by the sheer volume of data being stored within this modified Sputnik, it was clear that through some unknown means, CLEO could access the entirety of the internets daily traffic through some link with a bandwidth greater than anything conceivable by current day technology. Quite openly, CLEO stated its bandwidth in the high zettabyte range, which Hunter exclaimed as being physically impossible for equipment with a volume of only zero point one cubic meters. At this point in his video debrief, Hunter seemed to visibly slump and slow-down becoming slightly sluggish with respect to mission controls questions. This only lasted a minute, but later added to the scepticism as to Hunters mental and physical wellbeing. In a quite reactionary manner, upon being asked to get other members of the ISRO crew to contribute to the debrief and hence alleviate the efforts needed by Hunter, he seemed to immediately improve his posture and restarted his exposition with renewed vigour.

CLEO, openly being an observation artificial intelligence, demonstrated to Hunter that Sputnik One was now able to make direct ecological and geological observations of the Earth. Indeed, it was open enough to include significant datasets in Hunters hour long video and data transmission to Earth. This data included atmospheric gas analysis, surface and water temperature data, metrological data and ice-pack observations. In itself, this was unsurprising as CLEO had evidently been snooping on the data transmissions of Earths many observation satellites, it could therefore obtain this information simply through data fusion, correlation and interpolation from many sources. However, a source of great confusion, concern and indeed fear was that these detailed data sets stretched back to the early 1960's well before humanity had the ability to make such orbital measurements, let alone measure such gases under laboratory conditions nor before the imperative of climate change monitoring had gained political weight.

While not explicitly stated by Hunter, or perhaps undisclosed by CLEO itself, later analysis of the huge dataset transmitted by Hunter during his debrief, revealed that the entity CLEO also had access to all economic data within the global stock-exchange network. Both long-term data and accurate

trend models seemed to be included, while the future projections indicated several sequential global but minor financial crashes in the years to come.

Towards the end of Hunters debrief, he seemed to become visibly agitated, and his usual professional technical tone became broken by Tourettes syndrome like behavioural, physical and verbal ticks. While his degradation was gradual, he explained and provided electromagnetic spectrographic data that showed that CLEO and this new version of Sputnik One was broadcasting on a frequency comb of multiple narrow terra-Hz band carrier frequencies. While this would be impossible within Earths atmosphere due to high oxygen and water attenuation, it was clear that CLEO had some form of high bandwidth link to a hitherto unknown location. At Hunters request of an explanation, CLEO made it clear that these THz band emissions were the redundancy for its higher bandwidth X-ray band communications. To whom was something CLEO, or Hunter, was unwilling to divulge. Neither for that manner, was the specifics of the technology that could achieve such a transmission protocol.

At this point Hunter was showing signs of physical agitation beyond the ticks and loss of verbal agility. The video stream showed he was physically sweating, while ISRO medical telemetry showed his heart rate was nearing one hundred and seventy. Just prior to the cessation of transmission, as mentioned against the wishes of mission command, Hunter explained that whatever modifications had been made to Sputnik, they were entirely passive. Only observation and no offensive functionality was included within the sphere. Military and economic strategists agreed in the hours after Hunters transmission that this was unlikely to be entirely true. That despite having no weaponry, significant damage could be done simply by giving the data to the wrong splinter groups and rogue nations that operated outside of the current worldwide treaties.

At 22:50, the Space-X capsule docked with ISRO. Very little was found, both physically and amiss. The crew of ISRO had woken and were having breakfast, seemingly oblivious to the events of the previous hours and unaware of the time difference between ISRO time and Earth universal standard time. Blood tests revealed that large quantities of medical anaesthetic had been released into the crew quarters, while computer records showed no issues, other than the time discrepancy of the machine clocks. Dr James Hunter

was not aboard, while his medical observation telemetry had been rigged to show data from the previous day, a symptom of the ISRO on-board clock discrepancy.

As the Space X team moved through the ship and as ISROs own staff began moving towards their daily tasks and assigned stations, there was no further evidence of tampering in IRSOs systems and no signs of Hunter. Checking the hold and the stored position of the ISRO robotic manipulation arm, there was no evidence of this modified Sputnik device, no evidence of Hunter and no computer transaction evidence of the artificial entity CLEO. It wasnt until the following day, that a routine computer-automated check of oxygen tank levels within the main hold, revealed a drop of tank level consistent with a few hours of human activity. Upon a visual inspection of these tanks, a small hand written note was found. This was nothing more than a torn rough triangular corner of a service manual. In Hunters writing this simply said *'CLEO = COVERT LONG-TERM EARTH OBSERVER'*. Some speculated this was the agitated Hunters way of disclosing what CLEO was.

In the five years since this incident, we have many unanswered questions. But we also have evidence. For one, the data set and in particular the future projections for financial crashes and economic market values have panned out remarkably accurately, indeed there has, to date, only been a departure of 0.23% of the Dow Jones and 0.17% of the NASDAQ from these CLEO/Sputnik modelled projections. But more important than the evidence, who is watching us? Who manufactured the entity CLEO? Who stole and modified, and even faked the destruction of Sputnik One? Who is spying on us? And who is tracking our every move, our every transaction, our conversations and secrets and our every creative output?

We know, as a definitive, verifiable fact, that no commercial or governmental agent of society produced this covert observer, and if Hunter is to be believed we know for a fact that we do not yet possess such technologies he described. We are unable to account for the historical datasets surpassing the creation of our own low earth orbit observation satellites. Hunter was right though, CLEO and its corporeal vessel Sputnik One was an observer. But doesnt an observation imply an observer?

It would be too simplistic to state that CLEO was that observer, just from Hunters scrawled note. But if Hunter was right, that CLEO transmitted high-bandwidth observations on the THz and X-ray bands, then who is the observer of this observers observations? The very act of CLEO transmitting this wealth of information about us, implies an observer, somewhere, receiving this data. Does it not?

And so, with no answers, and only an hours burst of data transmission, we must resign ourselves to the paranoia and assumed knowledge that someone or something is watching us, is studying us, is monitoring our societal progress and is remarking upon our slow destruction of our own planet. If anything, we can say that CLEO was taunting us, that its openness was a way of making our paranoia, our fear, our psychoses all the worse.

The End...