THE 2015 MANFRED LACHS SPACE LAW MOOT COURT COMPETITION

INTERNATIONAL COURT OF JUSTICE

SPECIAL AGREEMENT

BETWEEN

THE SOVEREIGN PEOPLES INDEPENDENT DEMOCRATIC REPUBLIC (SPIDR)
(APPLICANT)

AND

THE UNITED REPUBLIC OF ADVENTURA (URA)
(RESPONDENT)

JOINTLY NOTIFIED TO THE COURT

COUR INTERNATIONALE DE JUSTICE

COMPROMIS

ENTRE

LA SOVEREIGN PEOPLES INDEPENDENT DEMOCRATIC REPUBLIC (SPIDR)
(REQUÉRANT)

ET

LA UNITED REPUBLIC OF ADVENTURA (URA)
(RÉPONDANT)

NOTIFIÉ CONJOINTEMENT À LA COUR

THE 2015 MANFRED LACHS SPACE LAW MOOT COURT COMPETITION

CASE CONCERNING PLANETARY DEFENSE

Statement of Agreed Facts:

1. The United Republic of Adventura (URA) and the Sovereign Peoples Independent Democratic Republic (SPIDR) are separated by the Cold Ocean, a large body of water with URA on its Western shores and SPIDR sharing its Eastern shores with a number of other countries. Both have major space agencies conducting civil space activities: the Federal URA Space Agency (FUSA) and the SPIDR Space Agency.

2. FUSA and the SPIDR Space Agency have developed programs to address potential threats posed by near-Earth objects (NEOs). In addition, URA and SPIDR have been actively engaged in the Working Group on Near-Earth Objects of the United Nations Committee On Peaceful Uses of Outer Space (UNCOPUOS).

3. URA is the lead state of a consortium of nations which was formed for the purpose of developing capabilities to address actual collision threats posed by individual NEOs. Those programs focus on development of "gravity tractors"[1] to deflect NEOs such that they do not pass through any threatening "keyholes".[2] The URA Consortium (URAC) also licenses the utilization

[1] A 'gravity tractor' works on the basis of two-way gravitational attraction between the NEO and the 'tractor', such that placing the tractor in front of the NEO would marginally 'speed it up' within its orbit whereas placing the tractor behind the NEO would marginally 'slow it down' likewise. By speeding it up, the NEO would pass a future intersection with the orbit of the Earth well ahead of Earth passing that intersection, hence avoiding a collision; whereas slowing the NEO down leads it to pass that intersection sufficiently much later than the Earth to achieve the same net result – no collision.

[2] A 'keyhole' is a fairly limited three-dimensional area in outer space of such a nature that if the orbit of a NEO passes through it, that NEO is quite certain to collide with the Earth a number of years later on a date which can be rather precisely determined. Consequently, making sure a NEO misses a keyhole ('keyhole deflection') ensures it will *not* collide with the Earth.

of NEO resources. All of the members of the consortium have signed or ratified the Moon Agreement, however, not all the states that have signed or ratified the treaty are part of the URAC.

4. The most ambitious element of FUSA's NEO Program involves the development, construction, launch and operation of a Titanium Autonomous Save-the-Earth Robotic Orbiting Industrial Depot (TASEROID) in an Earth orbit at an altitude of approximately 1,000 km. TASEROID, an unmanned space station, was launched into orbit by FUSA and became fully operational as of 1 February 2019. It serves as an on-orbit warehouse for consumables. FUSA uses the depot for its own space activities and stores and then sells oxygen, hydrogen, and other natural resources brought back from NEO missions to other space-faring nations or commercial entities.

5. Anticipating the launch and operation of TASEROID, FUSA started development of TYRUS (Twelve Yard Resource Utilization System) in July 2010. TYRUS is a highly capable robotic space system designed to be launched to NEOs in order to harvest valuable mineral resources there and deliver them to TASEROID.

6. Meanwhile, the SPIDR Space Agency had developed its own national space program, which included the establishment and operation of a manned space station in Earth orbit. SPIDR also conducted a NEO program, and in that context, had realized in 2003 that Floyd-4, a roughly pig-shaped asteroid of some 600 by 150 by 200 meters in size, would make a near-Earth pass in June 2011. That discovery came to public attention in November 2010, when the SPIDR Space Agency announced that its calculations undertaken in April 2010 had shown a heightened likelihood for Floyd-4's trajectory to present a serious risk of colliding with Earth sometime in the future. the SPIDR Space Agency also announced that it had been preparing a robotic spacecraft called KNUD-1 (Kosmic Near-earth Utility Developer) to visit the asteroid and if possible land[3] on it to conduct scientific research as part of an early phase of its own NEO assessment and threat mitigation program. KNUD-1 was launched in November, 2010.

7. Over the Spring of 2011, based on the general scientific information available regarding Floyd-4, FUSA singled out that same asteroid as a particularly interesting target for its first mission, with a second nearby pass in February 2024 giving rise to a launch window of less than

[3] Spacecraft such as are mentioned in the text do not "land" on an asteroid in the traditional sense due to its weak gravity. Rather, a spacecraft will attach itself to the surface by means of a variety of mechanisms.

two months in the course of late 2023. While KNUD-1 was en route, FUSA scientists examined Floyd-4 with telemetry using ground based equipment and lunar-orbiting spacecraft, and concluded that it likely was a carbonaceous chondrite containing considerable deposits of water and hydrocarbons. At a press conference in May 2011 FUSA announced that it had established a telepresence on Floyd-4 by such telemetry, and would establish a physical presence on the asteroid by sending the first TYRUS mission to the NEO.

8. This announcement gave rise to public protests and heated debate within SPIDR as the public viewed the TYRUS mission as an affront to the SPIDR space program. The SPIDR government published an official statement on 1 June 2011 which included claims that SPIDR had 'priority' rights to any use or exploitation of Floyd-4, that KNUD-1 was due to arrive at the NEO later that month, and that once KNUD-1 attached to Floyd-4 only the SPIDR Space Agency would have the competence to properly judge the safety risks involved in attaching a second craft to the surface, including possible risks of altering the structural consistency and/or orbital characteristics of the asteroid. the SPIDR Space Agency issued a press release that declared that it had authorized the development of a much larger spacecraft, KNUD-2, to visit Floyd-4 during its next pass close to Earth during February 2024, to harvest the resources of the NEO and deliver any resources so collected to the SPIDR space station.

9. While in transit to the NEO, sensors on board KNUD-1 examined Floyd-4 and a landing/attachment site was designated as the most feasible and convenient location on the asteroid due to its complicated topography. KNUD-1 arrived at Floyd-4 as scheduled, and after orbiting the asteroid for a few weeks, successfully touched down at the designated attachment spot on the NEO's surface and anchored itself to the asteroid's regolith in June 2011. In the following months, KNUD-1's scientific instruments radioed back a wealth of information on the Floyd-4. The scientific results of the KNUD-1 mission were widely shared with the global space operator and scientific community. Notably, KNUD-1 confirmed FUSA's conclusion that Floyd-4 was a carbonaceous chondrite and contained significant deposits of water and hydrocarbons.

10. The URAC decided to commercially exploit the resources of Floyd-4 to provide a funding source for further NEO planetary defense activities. The URAC announced that it intended to leverage the innovation capacities in the private sector, and invited private entities so interested to develop autonomous NEO docking capabilities and engage in NEO threat mitigation activities together with the URAC. In return for the technologies developed and future royalties, the URAC stated it would license such private entities to undertake missions to Floyd-4 for the purpose of harvesting the mineral resources. The URAC declared that there was a moratorium on the extraction and exploitation of the resources of Floyd-4 and other NEO's

pending the issuance of the licenses, and that only those entities from states which are party to the Moon Agreement would be allowed to apply for a license.

11. Both SPIDR and URA issued periodic warnings to each other not to interfere with or otherwise put at risk their own respective missions. During the meetings of UNCOPUOS, URA and SPIDR each asserted they had the right under international law to land on Floyd-4 and conduct their respective missions on the asteroid. Both FUSA and the SPIDR Space Agency proceeded with preparations for their respective missions.

12. FUSA launched TYRUS on 22 October 2023 from the FUSA launch facility in URA. The spacecraft rendezvoused with Floyd-4 on 6 February 2024, and tried to touch down in the same preferred attachment area as KNUD-1. After several unsuccessful attempts, TYRUS managed to attach itself to the asteroid. The surface of the NEO was altered in the process.

13. Whilst SPIDR had made a great effort to launch KNUD-2 before the launch of TYRUS, it was not able to overtake URAC's mission; the original launch date of KNUD-2 had to be postponed twice because of minor but potentially risky anomalies. Ultimately, the spacecraft was launched on 3 December 2023, a few days before the launch window for Floyd-4 closed.

14. Following the launch, SPIDR announced, without any consultations with either FUSA, URAC, or other states members of the UNCOPUOS NEO Working Group, that KNUD-2 was scheduled to arrive at Floyd-4 on 7 March 2024. SPIDR publicly summoned FUSA to ensure that TYRUS would have disengaged from its position by that date to allow KNUD-2 upon its arrival to use the same preferred attachment area where the KNUD-1 had attached to the surface. SPIDR stated that the presence of TYRUS in the proximity of the attachment area substantially increased the risk of a failure in attaching KNUD-2 to the NEO. Neither URA nor the URAC made any public response to the demand to disengage TYRUS.

15. As TYRUS was undertaking its first thorough close-up inspection of Floyd-4 from its attached site on the surface and KNUD-2 was making its way to the same site, new developments took place with respect to an asteroid named Syd-1. Syd-1 was a more or less diamond-shaped NEO estimated to be about 100 meters in size, with a preliminary indication of being a carbonaceous chondrite.

16. Syd-1 had already been detected by FUSA in 2020, and had been estimated at the time to have a chance in the order of 1 to 650 of colliding with the Earth on 27 October 2031 because of a keyhole in its trajectory which it was scheduled to pass on 27 October 2028. On 17 February 2024, however, following analysis of new tracking data FUSA officially announced a

recalculated estimate of a 1 in 80 chance of Syd-1 encountering the keyhole resulting therefore in a subsequent impact with Earth on 27 October 2031. The risk corridor of potential impact points was shown to cross the Earth passing over both URA and SPIDR as well as the Cold Ocean between the two countries, with the Earth situated approximately at the center of the uncertainty ellipse. [4]

17. FUSA also calculated that, within six months, Syd-1 would happen to enter a window whereby it would be in a position where the TYRUS could be relaunched from Floyd-4 and rendezvous with the Syd-1. This would offer a unique opportunity to redirect the TYRUS mission to act as a gravity tractor on Syd-1, causing the asteroid to change velocity sufficiently for the risk of collision with the Earth to be removed. Once that objective would have been achieved, any valuable natural resources on Syd-1 could also start to be harvested, if feasible.

18. On 26 February 2024, after various rapidly drafted alternative options for addressing the threat posed by Syd-1 had been discarded, FUSA announced that URAC would relaunch TYRUS from Floyd-4, fly it to Syd-1, confirm whether the asteroid was indeed on a trajectory for the keyhole, and if so, employ gravity tractoring for the asteroid to miss the keyhole.

19. Four days later, the TYRUS relaunch from Floyd-4 took place. However, the KNUD-1 was knocked over in the process and its antenna was oriented down toward the surface of the asteroid. This resulted in the loss of all communications to and from KNUD-1. TYRUS reached Syd-1 on 19 August 2024. Based on TYRUS transponder tracking shortly after arrival, it was determined that the asteroid was indeed headed for the 2028 keyhole and that the nominal impact point of Syd-1 in 2031 would lie in the Cold Ocean between URA and SPIDR. Within three days FUSA decided to station the spacecraft ahead of the asteroid to speed it up in order to ensure that the asteroid would miss the 2028 keyhole. Within three more days, FUSA announced that TYRUS had been able to move itself into a relatively stationary position ahead of the asteroid, and that the process of gravity tractoring to gradually speed it up had been successfully initiated.

20. Following the announcement of the decision on 22 August 2024 to speed up Syd-1, the SPIDR Space Agency quickly calculated that the effects of the TYRUS mission on the asteroid would amount to virtually dragging the potential impact point across the surface of, *inter alia*,

[4] The "uncertainty ellipse" is the area around a central virtual impact point where, due to the margins of error in the calculations of orbital trajectories, there is *a* possibility of impact, with statistically speaking the most likely actual impact being in the heart of the ellipse – the central virtual impact point.

SPIDR before it would disappear off the Earth altogether. This also meant, according to the SPIDR Space Agency, that if something went wrong in the course of TYRUS' operations, the chances of Syd-1 actually crashing into SPIDR territory would be considerably larger.

21. The government of SPIDR consequently protested in various fora, most notably UNCOPUOS, against the "unilateral decision by FUSA to put SPIDR at greater risk", even temporarily, where in its opinion moving the Syd-1 in the other direction - that is slowing it down rather than speeding it up - "would have virtually moved the possible impact points over a considerably smaller amount of territory before disappearing off the earth altogether, even if that would have included a portion of URA territory".

22. Meanwhile, on 7 March 2024 KNUD-2 had rendezvoused with Floyd-4 according to plan, found the preferred attachment site available since TYRUS had left on its second mission. The physical structure of the surface had been altered due to TYRUS' previous efforts to attach to Floyd-4, and KNUD-2 had a difficult time successfully attaching to the NEO. In the process, the scientific instruments which were planned to further investigate Floyd-4 were damaged irretrievably. In addition, the solar panels of KNUD-2 were damaged and could operate only at 30% of their intended capacity.

23. As a consequence KNUD-2, instead of remaining on Floyd-4 for over three years as originally intended, had to depart just four months after docking, on 4 July, in order to safely make it to the SPIDR manned space station. It did so on 20 August 2024, and delivered just 10% of the resources intended to have been extracted from Floyd-4.

24. The government of SPIDR immediately issued a statement that it held URA responsible and liable for the damage caused to KNUD-2 and the consequent limitations to the ability of KNUD-2 to harvest any valuable minerals. URA responded by claiming the right to prior harvesting in combination with its decision to redirect the TYRUS mission to mitigate the threat posed by Syd-1 for the benefit of SPIDR as well as the rest of mankind.

25. The orbit of the Syd-1 was altered by the gravity tractoring, however it was determined after the keyhole event of 2028 that the risk corridor for the 2031 encounter did not completely miss the Earth but rather moved toward the SPIDR coast of the Cold Ocean.

26. In September 2031, the asteroid entered the atmosphere and produced an air burst with the estimated equivalent of 2.1 megatons of TNT at an altitude of roughly 10.1 kilometers over the Cold Ocean near SPIDR. The airburst completely destroyed the town of Dropgum, a fishing village located on the coast in northern SPIDR. Mass evacuations had been conducted along the

impact corridor within SPIDR in advance of the impact, including Dropgum, and the loss of life was held to several dozen people.

27. Ensuing diplomatic discussions failed to resolve the dispute. Both states agreed to bring their dispute before the International Court of Justice by way of this Compromis.

28. The government of the Sovereign Peoples Independent Democratic Republic requests the Court adjudge and declare that:
(i) URA is liable for damages under international law to SPIDR for changing the orbit of Syd-1, which resulted in the loss of life and damage to Dropgum; and
(ii) URA is liable under international law for the loss of or damage to the first KNUD-1 spacecraft, and the loss of the KNUD-2 harvesting operation on Floyd-4;
and to dismiss all claims to the contrary.

29. The government of the United Republic of Adventura requests the Court adjudge and declare that:
(i) URA is not liable under international law for damages to SPIDR caused by Syd-1;
(ii) URA is not liable under international law for any loss of or damage to the two KNUD spacecraft;
and to dismiss all claims to the contrary.

30. Both URA and SPIDR are parties to the Outer Space Treaty, the Rescue Agreement, the Liability Convention, the Registration Convention, the UN Charter, the ITU Constitution and ITU Convention, as well as members of the UNCOPUOS Working Group on Near-Earth Objects, having signed up to the general commitments undertaken in that context. URA is a party to the Moon Agreement. There is no issue regarding the jurisdiction of the Court. The law at the time the case is heard is substantially the same as of 31 December 2014.

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Timeline of major events for easy reference

• 2003	The SPIDR Space Agency discovers Floyd-4 & calculates near-Earth pass in 2011; starts developing KNUD-1 mission
• April 2010	New SPIDR Space Agency calculations show heightened collision risk for Floyd-4
• July 2010	FUSA starts development of TYRUS
• November 2010	The SPIDR Space Agency announces new information on Floyd-4 & launch of KNUD-1
• May 2011	FUSA announces telepresence on Floyd-4 and singles out Floyd-4 as first NEO to be targeted by TYRUS
• 1 June 2011	SPIDR claims priority rights on Floyd-4
• June 2011	First near-Earth pass of Floyd-4; the SPIDR Space Agency lands KNUD-1 on Floyd-4
• Remainder of 2011	Scientific information on Floyd-4 widely shared with international community
• 1 February 2019	TASEROID fully operational
• 2020	FUSA detects Syd-1, and 2028 keyhole for Syd-1, possibly giving rise to Earth impact in 2031
• 22 October 2023	FUSA launches TYRUS mission to Floyd-4
• 3 December 2023	The SPIDR Space Agency launches KNUD-2 mission to Floyd-4; announces scheduled arrival on 7 March
• February 2024	Second nearby pass of Floyd-4
• 6 February 2024	TYRUS lands on Floyd-4
• 17 February 2024	FUSA announces 1 in 80 impact risk of Syd-1 in late 2031
• 26 February 2024	FUSA decides to use TYRUS for keyhole deflection of Syd-1
• 2 March 2024	TYRUS relaunches from Floyd-4, sets course for Syd-1
• 7 March 2024	KNUD-2 lands on Floyd-4
• 4 July 2024	KNUD-2 relaunches prematurely from Floyd-4
• 19 August 2024	TYRUS reaches Syd-1
• 20 August 2024	KNUD-2 reaches SPIDR Station; SPIDR government releases statement on responsibility & liability of URA
• 22 August 2024	TYRUS commences gravity tractor operations at Syd-1
• August 2024	SPIDR protests unilateral decision of FUSA to speed up Syd-1
• September 2031	Airburst of Syd-1 over the Cold Ocean