The Hard or Soft Law of "Gravity"?

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Abstract

How are international legal norms and outer space law portrayed in the popular mass media? This paper compares how two Academy Award winning films depicted space law norms about the aid and rescue of astronauts. *Marooned* (1969) and *Gravity* (2013), produced and released during distinctive eras of space exploration, are stories about astronauts facing fatal challenges to their attempts to leave orbit and return safely to earth. Both films offer an exciting cinematic experience about the promise and peril of outer space exploration from the astronaut's perspective for earthbound audiences. While both films depicted international collaboration as key plot elements, they did so without specific reference to the international legal regime that has as its "hard" treaty law goal the promotion of international cooperation in outer space as the "province of mankind." Nonetheless, *Marooned* does depict active international collaboration to render aid, while in *Gravity* the lone astronaut must fend for herself amid a much more globalized orbital infrastructure. Because films may inform public attitudes towards national space policies, both *Marooned* and *Gravity* are analyzed as cultural expressions of the political discussion shaping each era's outer space legal regime. This paper compares how these two films depict the dominant cultural orientation to how the "envoys of mankind" are either entrapped by the "hard" treaty-based laws prevalent during *Marooned*'s era of space exploration as opposed to the more individualistic "soft" law expectation of voluntary global collaboration in outer space exploration portrayed by the lone astronaut in *Gravity*.

I. Introduction

While the 2013 film *Gravity* brought the specific problem of space debris to a direct cinematic encounter for millions of moviegoers, in a larger sense the film's plot performed an important public educational function as it portrayed a range of international collaborative aspects of space exploration beginning with its opening scene of the International Space Station (ISS). Indeed, *Gravity's* Mexican writer and director, Alfonso Cuarón, credited the 1969 science fiction film, *Marooned*, for inspiring his *Gravity* screenplay. In *Marooned*, the U.S. crew is stranded in orbit after a retrorocket failure, but receive assistance from their Soviet Cold War rivals just before their oxygen is fatally depleted. Both of these Academy Award winning films depicted an international dimension of space

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exploration as important tenets to their plots, but seemingly without specific reference to the international legal regime that has as its "hard" law, (i.e., treaty-based law) goal the promotion of international cooperation in outer space, the "province of mankind." The trend, however, in outer space governance has apparently turned toward "soft" legal arrangements in recent decades rather than treaties. This marks a major shift in outer space governance accompanied by a high degree of academic interest in understanding and explaining why this shift is taking place.

Political culture is increasingly considered to play a significant role influencing the range of options available to policymakers as determined "acceptable" and/or "legitimate" by the general public's cultural view. Media products, such as books, film, television, comic books, music, and other cultural expressions, have long provided a fascinating glimpse into mankind's future in outer space and how human beings will occupy and use the "Last Frontier." Do these cultural depictions of outer space provide us with a utopian or dystopian prediction of mankind's destiny as a space-faring species? Does outer space represent the chance for a new beginning minus the conflicts and tribulations that bedevil earth-bound inhabitants? Or, will we as a species project into outer space the same conflicts that divide any truly common effort to address the great challenges to our habitation on the "pale blue dot?" To a certain degree, the answers travel with the extension of rules into the outer space realm, and most specifically with the selection of "which rules" will govern human activities in outer space. Are there hard and fast rules that apply to everyone and to everyplace in space, or will we be better served by relying on voluntary guidelines and adherence to norms on other worlds? In the end, are we establishing a political culture for outer space that seeks taxpayer support based of a belief in the immutability of space legal principles, or a more flexible approach to space governance?

This paper focuses on the gap between soft law depictions of voluntary international collaboration in outer space exploration and how films seemingly eschew plot twists incorporating the actual hard law aspects of the outer space legal regime stipulating such cooperation. The paper utilizes critical cultural theory to deconstruct elements of two major outer space films to analyze the factors motivating the observed bias against the hard law space regime, juxtaposed against the more benign or positive depiction of soft voluntary collaboration in the final frontier.

II. Analyzing Media

Films, like works of literature, are creative expressions of human imagination, and as such, require a "suspension of disbelief" as set out as an implicit

collaborative contract between the creator(s) and their audience.[1] The filmmaker or author creates a world into which the audience willingly enters, knowing in advance that this altered world of the creator's soft subjective reality may not correspond to the hard realities of the objective world. The audience members, though, expect the creator to treat them with respect with regard to the audience's expectations and beliefs about how this created world "works." Analogously, the realm of international law shares some similarities to literature, in the way that participants enter a created world in which the soft subjective reality of states as sovereign equals collides with the hard objective reality of power politics. Human beings continuously co-habit both the world of the mind and the world of things, seeking clues from each that can help them sort out the unknowns in the other. This is the role of the "story." Through the story, science informs art, and art (or literature) creates meaning for science. The question here then becomes, do films about outer space inform or influence the way human beings think about the meaning of outer space for the human story? Of course they do! But what messages do fictional film stories send about the role of international law in space exploration, and how might such messages influence audiences' support for their nations' space programs?

Analogous to the film-making process, this paper proceeds in a three-step analysis: pre-production, production and post-production. In pre-production, we review the plot lines of each of the two films as expressions of human stories in outer space. In the production stage, the paper drills deeper to examine each film's story as juxtaposed against the backdrop of international space law. Finally in the post-production stage, we attempt to evaluate what kind of message the audiences are likely to retain about the legal dimension of international space exploration. The concluding section of the paper will assess how these films exemplify cultural expressions that inform and confirm the contemporary trends in the legal evolution of the outer space regime for each era, rather than challenge the underlying legal precepts. This analysis suggests that *Marooned* reflects the hard treaty-based law of the early era of space exploration, contrasting with *Gravity's* soft law orientation, reflecting differences in social attitudes toward international cooperation prevalent at the times they were made.

1 Attributed to Samuel Taylor Coleridge, "Suspension of Disbelief," *Wikipedia*, Source: http://en.wikipedia.org/wiki/Suspension_of_disbelief (accessed May 28, 2015).

III. Marooned: Trouble in Orbit

III.1. Pre-Production

Marooned was released some four months after the Apollo 11 moon landing in July 1969. The filmmakers' timing of the release attempted to capitalize on the spike of public interest in the outcome of the space race between the United States and the Soviet Union to determine whether the first astronauts on the moon would be American or Russian.[2] It was high drama to the last act. Even as Apollo 11 was on its way to Tranquillity Base, the Soviet Union attempted to show its space prowess by launching Luna 15, a robotic sample-return probe, that some in NASA suspected would try to upstage the U.S. landing by returning moon rocks to earth perhaps only hours before Apollo 11's return. The two simultaneous missions to the moon also marked a significant legal milestone in space cooperation envisioned by the Outer Space Treaty (OST).[3] Two states were simultaneously sending exploratory vehicles to another celestial body in a cooperative manner exemplified by the Soviet Union's informing the United States about the trajectory of Luna 15 so as to allay any possible collision concerns.[4] Unfortunately, Luna 15's signal went silent during its landing approach, leading some to speculate that it crashed into a lunar mountain. Neil and Buzz had the moon to themselves.

Marooned is the story of an American crew of three astronauts who are trapped in an Apollo spacecraft as they attempt to return to earth following an extended stay in a Skylab-like space station. When the service module engine repeatedly malfunctions during attempted automatic and manual-override retro-grade burns to bring them out of orbit, they find themselves unable to return to the space station or to use the secondary manoeuvring rockets to de-orbit. They are "marooned" in orbit with quickly dwindling supplies of oxygen.

Prescient to Apollo 13's "failure is not an option" credo, the numbers-crunching Gregory Peck character, who as the NASA boss, decides a rescue is too risky, is overruled by none other than a very Richard Nixon-esque voice who says that "politically, NASA only has a healthy budgetary future if it can maintain public support," and to do that requires NASA to show their humanity by at least attempting to rescue the crew, risks be damned. Luckily,

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2 An excellent synopsis can be found on the Wikipedia site: https://en.wikipedia.org/wiki/Marooned_(film) (accessed June 17, 2015).

3 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (General Assembly resolution 2222 (XXI), annex) – adopted on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967.

4 Luna 15 was launched three days before the Apollo 11 launch on July 16, 1969. The probe, designed to return samples to earth, crash-landed on the moon while the Apollo 11 astronauts were preparing to lift-off from Tranquility Base. Source: https://en.wikipedia.org/?title=Luna_15 (Accessed June 19, 2015).

the U.S. Air Force has an experimental lifting body spacecraft (visually, remarkably similar to the U.S. Air Force's X-37B spaceplane currently in service) that the Richard Janssen head astronaut character will attempt to pilot to orbit and once there perform the orbital manoeuvres to reach the stricken *Ironman*.[5]

Tension mounts as *Ironman's* oxygen levels sink while a hurricane bearing down on Cape Canaveral delays the rescue craft launch. There is not enough oxygen for three astronauts to survive for the now-delayed rescue. The mission commander Richard Crenna character seemingly sacrifices himself for his crewmates by spacewalking to "repair the engine" and dies as his spacesuit rips. Just when all hope is lost for the oxygen-starved, muddle-headed astronauts, a Soviet cosmonaut appears outside the *Ironman* Apollo capsule, but given the small size of his space vehicle, he can offer no ride back. As the U.S. rescue craft now approaches, the Soviet cosmonaut assists the just-arrived Richard Janssen character in spotting one of the two surviving astronauts (Gene Hackman character) who had drifted untethered out of the *Ironman* capsule.

Finally, in a scene oozing of Cold War space cooperation, the never-identified Soviet cosmonaut enters *Ironman's* open hatch ostensibly to aid the James Franciscus character, incapacitated by the last throes of oxygen starvation. Shortly thereafter, the Richard Janssen character also enters *Ironman* and connects the James Franciscus character to an emergency oxygen supply in the nick of time to save his life. Both the cosmonaut and Janssen characters jointly assist the two stricken astronauts to transfer to the U.S. rescue craft. The closing scene shows the abandoned *Ironman* capsule adrift in the cosmic ocean.

A young boy in Mexico repeatedly watched *Marooned* whenever it was shown on television. In 2013, Director Alfonso Cuarón would develop and release his own film version of a marooned astronaut in his movie masterpiece *Gravity*.[6]

III.2. Production

In 1969, governmental space entities authorized and financed by the Soviet Union and the United States completely dominated the range of civilian and military space activities and missions. But Hollywood clearly predicted a much more visible commercial component to space activities in the not-so-distant

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5 See, Leonard David. "Air Force's Mysterious X-37B Space Plane Passes 400 Days in Orbit," *Space News*, January 29, 2014. Source: www.space.com/24459-x37b-space-plane-mission-400-days.html (accessed June 23, 2015).

6 Wikipedia, quoted from *Wired* article by Caitlin Roper, "Why *Gravity* Director Alfonso Cuarón will never make a space movie again," *Wired*, October 1, 2013. Source: https://en.wikipedia.org/wiki/Marooned_(film)#cite_note-7 (Accessed June 19, 2015).

future. In the late-1960s, private commercial space entities existed almost solely on the silver screen, not in orbit.[7] In the 1968 film, *2001: A Space Odyssey*, a commercial airline, the now long-defunct *PanAm Airways*, is shown operating space shuttles to the orbiting space station, where space commuters are lodged in a Hilton Hotel and where they can make a video call to loved ones on earth via the Bell System. Ironically, 1969 was also the year that saw a U.S. governmental entity develop an innovative packet-switching data network we now call the Internet.

Let's go back to *Marooned* and its legal setting. Only slightly more than a year prior to *Ironman*'s retro-rocket crisis, the world community saw entry into force of two treaties that specifically address the crew's plight and the film's plot. The first treaty, of course, is the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,* which entered into force in October 1967. Usually referred to as the "Outer Space Treaty" or "OST," it served as the foundational bedrock for subsequent legal treaties and agreements establishing outer space governance. Among the treaty's provisions, those most relevant to *Marooned* are found in Article V. These include defining the legal status of the astronauts as "envoys of mankind," and stipulating that State Parties have a mutual obligation to "render all possible assistance to the astronauts of other States Parties."[8]

The second treaty already in force by the date of *Marooned's* theatrical release was the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space,* otherwise known as the "Rescue Agreement."[9] As the seminal Dembling and Arons article points out, the Rescue Agreement amplified and operationalized the humanitarian impulse behind the astronaut aid and rescue provisions found in the Outer Space Treaty.[10] In a telephone call between NASA Director Keith (Gregory Peck) and the U.S. President, the possibility of a Soviet rescue is briefly discussed:

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7 The exception, of course, was Telstar, the first privately sponsored space launch in 1962. Source: https://en.wikipedia.org/?title=Telstar (accessed June 19, 2015).

8 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967. Source: www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (accessed on June 23, 2015).

9 See, Dembling, Paul G. and Arons, Daniel M., "The Treaty on Rescue and Return of Astronauts and Space Objects" (1968). *Documents on Outer Space Law. Paper 4.* Source: http://digitalcommons.unl.edu/spacelawdocs/4 (accessed June 24, 2015).

10 Ibid.

President: What about the Russian spacecraft?

Keith: No, they can't help us. I've already talked to them. I know Kashvin pretty well. You see, their Voshkod's in the wrong orbit, won't wash.

This conversation reveals that the U.S. has officially informed the Soviet Union about the orbital emergency and that the possibility of a *Voshkod* rescue was considered but then rejected as impossible due to the *Voshkod's* orbital parameters.
A message is relayed to the command center. Keith attempts to contact the crew.

Keith: Ironman, this is Keith.
Ironman, a Russian spacecraft is making rendezvous with you.
Do you see a Russian spacecraft? Come in.
Stoney, do you see a Russian spacecraft?

Stoney: I see him.

Keith: Good. Now 30 minutes ago he made a change in orbit. He is moving towards you for rendezvous. We don't know what he's going to do. All you can do at this point is watch him. Watch him, Stoney do you read me?[11]

The cosmonaut opens the Voshkod hatch and attempts through hand signals to have the Ironman crew open their hatch.

Keith: Stoney, I want you to follow through with the Russian. Don't wait for Dougherty.

A few minutes later:

Dougherty: Keith, this is Rescue. I'm in the Apollo. The Russian got some air to Stoney [...] and I've transferred him to my oxygen now. He's all right, he's breathing. And I've got Lloyd.

[Joyous pandemonium breaks out at the good news]
The film concludes with parting shots of the *Voshkod* and *Apollo* spacecraft in orbit that bring "The End" onto the screen.

11 Mayo Simon (screenplay), Martin Caidin (novel), writing credits for *Marooned*. Source: www.springfieldspringfield.co.uk/movie_script.php?movie=marooned (accessed June 24, 2015).

III.3. Post-Production: The International Legal Setting for *Marooned*

Although international space law agreements were never explicitly mentioned in *Marooned*, the film nonetheless comes very close to complete compliance with the OST and Rescue Agreement. Using this three-item checklist, we can critique the film's treaty compliance.

III.4. Communication

Both the OST's Article V and the Rescue Agreement's Article IX stipulate an obligation to communicate about space exploration hazards to other space-faring parties:

> "Article V: [...] States Parties to the Treaty shall immediately inform the other States Parties to the Treaty or the Secretary-General of the United Nations of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could constitute a danger to the life or health of astronauts.
>
> Article IX: [...]. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, may request consultation concerning the activity or experiment."[12]

In the film, the U.S. and U.S.S.R. have communicated with each other, as indicated in the conversation between Keith and the U.S. President. But did the Soviet Union fully inform the U.S. about the orbit of the *Voshkod*? The major surprise of the film is the appearance of the Voshkod in the climatic conclusion of the film, but seemingly without any coordination with NASA. Interestingly, there appears to be a complete lack of agreement over common radio frequencies for rescue, as the cosmonaut cannot contact the American crew. With the most sophisticated radio equipment, the space farers are reduced to hand signals and flashlights due to apparently non-existent common radio protocols and frequencies.

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12 Articles V and IX, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (General Assembly resolution 2222 (XXI), annex) – adopted on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967.

III.4.1. Aid to Astronauts

The U.S.S.R. cosmonaut's does indeed carry out the Soviet Union's legal obligation under the OST (Article V) to "render all possible assistance to astronauts of other States Parties" by assisting in the rescue of the drifting astronaut and providing oxygen to the second stricken astronaut.

III.4.2. Use and Return of Space Object

Here is where we can speculate on the Soviet motives, which are perhaps not so altruistic. At the end of the film, we see the XR-V rescue craft fire its retro-rocket to leave orbit, while the Voshkod and Apollo capsule continue in their orbital trajectories, the Apollo capsule now empty and shown with an open hatch. Somewhat nefariously we can imagine the bounty of information the Soviet Union could gain if its cosmonaut were able to re-enter the now empty Apollo capsule and carefully record his observations about U.S. space technology. Contrary to maritime law, abandonment of a space object does not relinquish or change the legal status of ownership or liability. While entry of the U.S.S.R. cosmonaut into the Apollo capsule during the actual rescue took place without an explicit granting of permission by the U.S. space authorities, we can safely presume there was an implicit permission granted when Keith informed the two U.S. astronauts to "follow the Russian." In the end, we don't know whether the Voshkod lingered in the vicinity of the Apollo capsule or whether there was later another entry into the Apollo capsule, this time without any explicit or implicit permission from the U.S. space authorities.

IV. *Gravity*: Globalization's *Tour de Force*

IV.1. Pre-Production

Gravity was released in 2013, to widespread acclaim and box office success. Millions of moviegoers reveled in the visual 3-D special effects that thrust them into a story of astronauts marooned in space. But outer space in *Gravity's* 2013 is a far different place than *Marooned*'s 1969. Many more countries, companies, and objects are in orbit. The International Space Station (ISS) shares orbital space with China's Shengzhou space station. Both demonstrate the proliferation of high technology prowess and awareness of the key role space technology plays in terms of 21st Century infrastructure and societal development. Space is more diverse, and, more ominously, crowded.

IV.2. The Internationalized Setting for *Gravity*

While *Marooned's* astronauts and cosmonaut were white males ostensibly in their 30s, the people populating earth's orbital space in the 21st Century's *Gravity* demonstrate a much more multi-cultural aspect to space exploration. This is exemplified in one of the film's first scenes where an Indian astronaut Dr. Shariff Dasari sings an Indian pop song out of the 1950s, *Mera Joota Hai Japani,* ("My Shoes are Japanese") while taking a break during extra-

vehicular servicing of the Hubble Space Telescope. Alfonso Cuarón, a Mexican director and screenwriter, depicts in this way a strong allusion to the globalization of space exploration by having Astronaut Dasari sing a song lyric about how even though *[...] My shoes are Japanese, these trousers English; The red cap on my head, Russian, yet my heart is Indian.*[13]

Of course, gender diversification is also evident as the lead protagonist is a female astronaut, Dr. Ryan Stone, played by actress Sandra Bullock, and who, playing the lead role at the age of 49, also represents the greater chronological diversity of orbital denizens than those cast in *Marooned* almost two generations earlier.

The immensity of *Gravity's* space is balanced by its depiction of the size and scale of the ISS. These are huge structures, which, unencumbered by gravity, can be constructed to a truly awe-inspiring scale. Such a scale is also a much bigger target. The pivotal plot point is the threat posed by space debris as a Russian missile destroys a satellite, creating a space debris cloud that intersects the orbit of the ISS and the Space Shuttle *Explorer*. Catastrophe ensues as the debris cloud hits and destroys the Space Shuttle and the ISS, ultimately marooning Astronaut Stone in orbit and disrupting communication and guidance from mission control in Houston.

IV.3. Production

Astronaut Stone's *Gravity* journey is literally a *tour de force* through the various globalized legal regimes of 21st Century space exploration. Unable to seek refuge within her own country's Space Shuttle *Explorer* (legacy superpower sole sovereignty vehicle), after it is heavily damaged and its other crew members killed by space debris, space rookie Dr. Stone and surviving veteran astronaut Matt Kowalski (George Clooney) attempt to access the Russian Soyuz craft through the massive ISS, illustrating the mixed jurisdictional multinational collaborative regime. Their spacewalk to the ISS is unsuccessful due to the premature deployment of the Russian Soyuz's parachute caused by impacts of space debris. Caught in the shrouds of the Russian spacecraft's parachute, Dr. Stone's life depends on astronaut Kowalski's willingness to detach himself from her lifeline and thereby doom himself to an orbital demise. Drifting away, he calmly advises Dr. Stone to enter the ISS in order to gain entry to the Russian Soyuz spacecraft, which is now useless for re-entry but could be employed for a "Sunday drive" to the Chinese space station, conveniently orbiting a relatively short distance of 100 kilometers away from the ISS. After piloting the Soyuz to the vicinity of the Chinese space station,

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13 See, Wikipedia, "Mera Joota Hai Japani," https://en.wikipedia.org/wiki/Mera_Joota_Hai_Japani (accessed June 29, 2015). In Sanskrit the text appears as: *मेरा जूता है जापानी, ये पतलून इंगलिस्तानी, सर पे लाल टोपी रूसी, फिर भी दिल है हिन्दुस्तानी, [Merā jūtā hai Jāpānī, ye patlūn Inglistānī, Sar pe lāl ṭopī Rūsī, phir bhī dil hai Hindustānī].*

Dr. Stone could spacewalk to the Chinese re-entry capsule, which could be used to de-orbit and return safely to the earth's surface.

Following the filming of Marooned, two additional outer space treaties were ratified that complement the OST and add to the legal dimension surrounding *Gravity*. The Liability Convention (*Convention on International Liability for Damage Caused by Space Objects*) and Registration Convention (*Convention on Registration of Objects Launched into Outer Space*) both promise a rich payday for Sandra Bullock's lawyers.[14] The Liability Convention stipulates that the launching state bears fault-based liability for damage to space objects in orbit, while the Registration Convention details how a growing number and types of space objects remain the legal responsibility of the launching state or state of registration. In both Conventions, the Russian act of intentionally destroying a satellite and in the process creating a debris cloud that destroys the ISS, the Shuttle Explorer, and the Chinese space station, as well as killing an unspecified number of astronauts, is clearly a real potentiality and within the purview of the space treaties.[15]

IV.4. Post-Production: The International Legal Setting for *Gravity*

As noted above, *Gravity's* story takes place in a much more diverse outer space environment, both in terms of the missions and the actors. However, the legal basis regulating these activities and actors are essentially the same as for *Marooned*. Let's examine *Gravity's* compliance with communication, aid, and return of space vehicle obligations under the outer space treaties.

IV.5. Communication

As quoted above, the OST's Articles V and IX and the Rescue Agreement's Article I, clearly stipulate an obligation to communicate about potential hazards or threats to the safety of astronauts. Under the cited articles, Russia's intentional destruction of one of its satellites would clearly require pre-notification if the action posed any potential safety threat to other users of the outer space region as either a "phenomenon," or as an activity that could cause "harmful interference." However, on this point, the film's script identifies not Russia but instead the North American Aerospace Defense Command (NORAD) as the source of information about the potential hazard communicated to the astronauts in a scene early in the film:

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14 Convention on International Liability for Damage Caused by Space Objects (resolution 2777 (XXVI), annex) – adopted on 29 November 1971, opened for signature on 29 March 1972, entered into force on 1 September 1972; *Convention on Registration of Objects Launched into Outer Space* (resolution 3235 (XXIX), annex) – adopted on 12 November 1974, opened for signature on 14 January 1975, entered into force on 15 September 1976.

15 *New York Times*, "The Villain in *Gravity* is Real, www.nytimes.com/2013/10/12/opinion/the-villain-in-gravity-is-real.html?_r=0 (accessed June 29, 2015).

MISSION CONTROL (V.O.) (over radio)

Uh, NORAD reports a Russian satellite has incurred a missile strike [...]. The impact has created a cloud of debris orbiting at twenty thousand miles per hour. Current debris orbit does not overlap with your trajectory. We'll keep you posted on any developments.[16]

The astronauts continue working to repair the Hubble Space Telescope until Mission Control in Houston again interrupts their activities with an update:

MISSION CONTROL (V.O.) (over radio)
Debris from the missile strike has caused a chain reaction, hitting other satellites and creating new debris. Traveling faster than a high-speed bullet up towards your altitude. All copy [...].

MISSION CONTROL (V.O.) (over radio)
Well, we have a full-on chain reaction. It's been confirmed that it's the unintentional side effect of the Russians striking one of their own satellites.

SHARIFF
They shot down their own satellite?

Matt pulls down a lever. Then moves upward.

MATT
Right of disposal. Most likely a spy sat gone bad. Now it's shrapnel.[17]

Quite notably, here is where *Gravity* makes a direct statement about international space law that actually creates a new legal privilege – the "right of disposal." Russia clearly fails to fulfill its communicative obligation under OST Articles V and IX, but in Russia's defense, the film creates a new right, i.e., the "right of disposal," that could form the legally novel basis for justifying the satellite's intentional destruction with the goal being space debris mitigation. Of course, the "unintentional" side effect will be hotly debated during the later legal proceedings.

IV.6. Aid to Astronauts

Without communications or other surviving astronauts, Dr. Ryan must fend for herself as she gains entry first into a burning ISS and then subsequently into the Russian Soyuz spacecraft, which she then uses to travel to the Chinese Tiangong space station. Although Dr. Ryan has no Chinese language ability, the earlier guidance from Astronaut Matt Kowalski indicated that the

16 Alfonso Cuarón and Jonas Cuarón, script and screenplay for film "*Gravity*." Source: http://gointothestory.blcklst.com/wp-content/uploads/2014/11/gravity_sp-copy1.pdf
17 Ibid.

landing protocols in the Shengzhou capsule were identical to those used by the Soyuz:

> *MATT*
> *You're gonna take the Soyuz, and you're gonna cruise over there. Chinese lifeboat is a Shenzhou.*
>
> *RYAN*
> *I've never flown a Shenzhou.*
>
> *MATT*
> *It doesn't matter. Its re-entry protocol is identical to the Soyuz.*[18]

IV.7. Use and Return of Space Object

The *Gravity* script is silent on whether Astronaut Stone is authorized to enter the Chinese Tiangong space station and use the Shenzhou space vehicle for her re-entry to earth. Furthermore, the film does not specify whether the Tiangong space station was unoccupied at the time of the space debris incident or whether it was abandoned in its aftermath. All the audience knows is that U.S. Astronaut Stone enters an unoccupied Chinese space station without explicit notification given to the Chinese space agency nor permission requested. In *extremis*, we can surmise that space law would characterize this unauthorized entry as an act of survival justifiable under customary international law.

The Shenzhou survives the perilous re-entry and apparently, from the language of the background radio transmissions and the Houston mission controllers heard on the Shenzhou radio, Astronaut Stone has landed it in a lake in the territorial United States' Midwest, possibly even the Lake Zurich of her childhood mentioned in an earlier dialogue with Kowalski. Happy ending.

In parallel to our discussion about the final disposition of the *Ironman* Apollo capsule in *Marooned*, China, under OST Article VIII, retains ownership of the Shengzhou vehicle after its return to earth, while the United States has an obligation under the same article to return the vehicle to China after it provides identifying information. To quote the article:

> "Article VIII
> A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose

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> registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return."[19]

If an international space lawyer were writing a new final scene of *Gravity*, we can well imagine that it would show a barge-mounted crane lifting the Shenzhou spacecraft out of Lake Zurich while Chinese and American space officials look on. It's a wrap!

V. Conclusion

This paper explores the cultural side of the policy evolution from hard to soft international law for outer space. After comparing how both films are representative of their respective eras in their depictions of how humans conduct activities and contend with challenges in earth's orbital space, we can now extend our analysis to the ways in which cultural expressions such as film potentially play a role in the policymaking arenas.

As noted above, both *Marooned* and *Gravity* represent cultural expressions about the real world political-legal-economic realities of their respective eras. As Academy Award-winning films, both received validation from film professionals and audiences alike that their stories about human beings facing life-threatening challenges in outer space are narratives that speak to our collective destiny at the "final frontier." In Marooned, the two space-faring superpowers are the only state actors engaged in humankind's space quest, while *Gravity's* orbit is filled with a wide diversity of activities, actors, and challenges. In sum, these are films that are closer to the actual techno-scientific reality of space exploration than science fantasy films such as the *Star Trek* and *Star Wars* genres. Why do we care, though, about what these quasi-real world films say to audiences about space exploration and how we as a species decide to extend human civilization and its rules beyond the earth?

First of all, such films carry out an important educational function in informing audiences about a subject the public knows little about, i.e., outer space. The vacuum of space is matched by the emptiness of public knowledge about it. Even in the United States, one of the pre-eminent space-faring nations, a recent survey of over 3,000 people found that 22% confused the methods and goals of "astronomy" with "astrology."[20] Other surveys have shown that 52% of the American public support human exploration of space, even while the average American believes NASA consumes 24% of the entire federal

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19 OST, Article VIII.

20 Elizabeth Palermo, "1 in 5 Americans Confuse Astrology and Astronomy," LiveScience, September 10, 2015, in an article about a survey conducted by the Pew Research Center measuring public knowledge of science. Source: www.livescience.com/52135-american-science-knowledge-poll.html (accessed September 16, 2015).

budget (actually less than .05%). Even more ominous for future funding of space exploration are survey results showing that 28% of Americans believed that NASA had closed, 40% believed the ISS had crashed, while 38% believed that "aliens walk among us."[21] Mass media in general, and films in particular, provide the vast bulk of the voting public with their only exposure to some of the realities of living and working in outer space. Although feature films take some scientific liberties (especially evident in *Gravity's* depiction of the space debris problem and its ability to cripple space telecommunications), they nonetheless leave the viewing public with an enduring impression of both the opportunities and challenges of outer space.

Secondly, the media in some ways create their own reality. Do media expressions about outer space influence what human beings decide to do in outer space? In other words, do films that are seen by millions of people have a political effect by informing public perceptions of a country's activities in outer space? The premise here is that a state's foreign policy behavior is, to some (unknown) degree, influenced by public attitudes that either support or oppose those policies. These can have very significant political ramifications for elected policy-makers if, as noted above, a sizeable proportion of the American public believes NASA's budget accounts for one-fourth of the entire U.S. Government budget. *Marooned* shows that outer space is not necessarily only a place for superpower rivalry, but that the deadly vacuum of space can also be filled with cooperative engagement against the common challenge. In *Gravity*, the lead protagonist had to "go it alone," more in keeping with the entrepreneurial ethos of an outer space environment that will be exploited by profit-motivated private enterprise. The hard treaty law in *Marooned* that is confirmed by the Soviet efforts to help rescue the dying American astronauts is absent in the soft law face of *Gravity's* radio silence.

Finally, cultural studies scholars have long investigated and theorized about popular culture's role as a factor shaping how humans perceive their civilization and its destiny writ large.[22] Humans understand their world through stories and the stories told by film are an increasingly prominent part of popular culture shaping public attitudes about how outer space will be explored. The story told by a middle-aged woman astronaut in *Gravity* is very different from that told from the perspective of thirty-something white males in *Marooned*. Space is a far bigger place in 2015 than it was in 1969, a frontier region used and occupied by a wider variety of states, corporations, and nationalities, each of which is pursuing its own vision of how outer space should be explored and exploited.

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21 Rod Pyle, presentation made to Space Tech Expo, May 19, 2015, Long Beach, CA. Source: www.spacetechexpo.com/visit/free-sessions-program-2015 (accessed September 16, 2015 and author's notes at the conference).

22 See, John Storey, *Cultural Theory and Popular Culture: An Introduction* (6th ed.). New York: Routledge, 2012.

In this important way, *Gravity* acts to validate the soft law approach envisioning that nation-states are now merely places to go rather than the journey itself. In *Marooned*, the stranded astronauts were appendages of the space-faring nation, and whether they were rescued or not was determined by the state apparatus. In *Gravity*, you are on your own. And this, then, is the cultural question: are we ready as a species to venture into the great ocean of outer space beyond the familiar state-centric structures of laws and governments?

Here is where cyberspace and outer space culturally merge. The "Wild West" of Internet governance is one in which today's online entrepreneurs only vaguely see state frontiers and rules; much more crucial are software platforms and APIs. Astronaut Stone speaks directly to a millennial generation raised with Internet-connected smartphones in their hands almost from birth. The challenge of international travel is now reduced to Google Maps and TripAdvisor, national borders (as exemplified by the current waves of smartphone-carrying migrants) are disappearing relics as ATMs and expedited passport/customs clearances are now largely online affairs. Astronaut Stone confronts her own self-doubts, represented in her thoughts relating to her tradition-bound role as a mother grieving over the loss of her child. Analogously, space-farers will always face criticism that humans should solve their traditional problems on earth before spending valuable resources to go "out there." But Astronaut Stone, alone and out of radio contact with mission control (i.e., the Internet), nonetheless articulates the cultural credo of this generation and the plaidoyer for soft law's more flexible and individualistic jurisdiction as she says into the microphone (much as someone posting on Facebook):

> *RYAN (into radio)*
> *Houston. Houston, in the blind.*
> *This is Mission Specialist Ryan Stone reporting from the Shenzhou. I'm about to undock from Tiangong [...] And I have a bad feeling about this mission. (chuckles)*
> *Reminds me of a story, Houston –*
>
> *Ryan cries out. CAMERA PANS TO the cabin window, then back to Ryan.*
>
> *RYAN*
> *Never-Never mind the story,*
> *Houston. Never mind the story.*
> *It's getting hot in here. Okay.*
> *All right. Okay.*
> *All right, the way I see it, there's only two possible outcomes. Either I make it down there in one piece and I have one hell of a story to tell, or I burn up in the next ten minutes. Either way, whichever way [...] no harm, no foul! Because either way [...] it'll be one hell of a ride. I'm ready.*
>
> *Ryan reaches out and grabs her helmet.*[23]

23 Gravity script, loc. cit.

Both films are significant cultural expressions telling an important story about humankind's innate drive to explore, understand, and expand the species' presence into the next frontier. The rules by which that is accomplished will also adapt to the cultural story that accompanies humans on their quest. Astronaut Stone's last words leave audiences with the story that in the end, it is the individual human being who has the freedom to make the choice, not the nation-state, and that no matter what the outcome of that trip into the unknown, "either way, whichever way, [...] no harm no foul! Because either way [...] it'll be one hell of a ride. I'm ready."[24]

24 Ibid.