

**THE INTERNATIONAL NUCLEAR MATERIAL TRANSPORT SECURITY REGIME:  
A MULTI-MODAL TAPESTRY OF CONVENTIONS AND AGREEMENTS**

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**ABSTRACT**

The international legal framework for transporting nuclear material is complex. The tapestry of conventions and agreements in place vary based on the material in transport, the mode or modes of transport used, and the location where the transport is taking place. The instruments range in scale from the international Convention on the Physical Protection of Nuclear Material and Nuclear Facilities and the Amendment to regional conventions and agreements such as those for rail transport (RID), inland waterway (ADN), and road (ADR). As part of their international commitments under the various conventions and agreements, signatories are required to abide by and harmonize their regulations to these international instruments. The challenge for Competent Authorities in drafting regulations consistent with a Member States obligation under international law can be complex. In addition to ensuring their own authority to draft regulations consistent with these conventions, a Competent Authority may need to coordinate with other ministries, departments, or agencies in mapping the various conventions, their annexes, the requirements therein, and understanding how to develop regulations that align both to international law and domestic law. This paper addresses each of these conventions and agreements; providing a summary description of what each means to individual entities that are transporting nuclear material, provide the total number of States Party to each, provide a graphical framework for unpacking the legal complexities at the international level to assist users and competent authorities in orienting themselves to the international instruments and how they apply to specific shipments. A detailed evaluation has been made of the various international and regional conventions and agreements that help govern the security during the international and in some cases the domestic transport of nuclear material, therein providing a tool for understanding the international transport regime for moving these materials.

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## **INTRODUCTION**

While transport is the most vulnerable part of the life cycle for nuclear and radioactive materials, safe and secure transport of radioactive material is dependent upon a multifaceted regulatory framework that combines all governing requirements, package certification, inspections and a robust and effective monitoring system. The IAEA assists Member States in strengthening this framework through the implementation of its transport regulations, ensuring the safe and secure packaging, support for adequate training and education and appropriate handling of these materials. What makes transport potentially the most vulnerable phase in the life cycle of radioactive material is the fact that it is packaged for movement on the conveyance. While in transit, the material has left the protection provided by a locked storage room or vault where it was protected storage.

Following the events of September 11, 2001, the international community recognized a responsibility to develop guidance to assist Member States in the implementation of adequate security for materials in transport. The International Atomic Energy Agency developed working groups focused on transport security and one of the results was the Nuclear Security Series (NSS) documents for Transport Security. The first version of NSS 9, “Security of Radioactive Materials in Transport” was issued in 2008. Most Member State transport regulations focused on safety as well, and only in recent years have recognized the importance of including a security focus. Security, for the purposes of this paper is defined as protecting the source or material, from people who may want to use it for malicious purposes.

The paper provides an overview of existing conventions and guidance, from the International Atomic Energy Agency (IAEA), the United Nations, and other international organizations. Ultimately the goal of this paper is to provide a awareness of the tapestry of international documents for Class 7 transport and create awareness for those countries starting out to draft and develop transport security regulations for nuclear and other radioactive materials.

## **IAEA LEGAL INSTRUMENTS AND INTERNATIONAL GUIDANCE**

Two international frameworks for the transport of nuclear materials have been developed under the auspice of the International Atomic Energy Agency (IAEA): the Convention on the Physical Protection of Nuclear Material (CPPNM) and the Code of Conduct on the Safety and Security of Radioactive Sources and supplemental Guidance on the Import and Export of Radioactive Sources.

The CPPNM was opened for signature on March 3, 1980 and entered into force on February 8, 1987. The Convention applies to nuclear material used for peaceful purposes while in international nuclear transport [1] and establishes measures related to the prevention, detection and punishment of offenses relating to nuclear material. According to Annex I of the CPPNM, international nuclear transport refers to the “carriage of a consignment of nuclear material by any means of transportation intended to go beyond the territory of the State where the shipment originates beginning with the departure from a facility of the shipper in that State and ending with the arrival at a facility of the receiver within the State of ultimate destination.” [1]. The

CPPNM is the only international legally binding undertaking in the area of physical protection of nuclear material (IAEA, 2019). There are 157 parties to the Convention with 44 signatories.

In July 2005, State Parties to the CPPNM adopted an Amendment to the Convention (CPPNM/A) and the Amendment was entered into force on May 2016. There are 118 parties to the CPPNM/A. The Fundamental Principle B in Article 2A(3) of the CPPNM/A states that each State party is responsible for “ensuring that nuclear material is adequately protected extends to the international transport thereof, until that responsibility is properly transferred to another State, as appropriate.” [2]

Annex I of the CPPNM outlines levels of physical protection that should be applied during international transport of Category I, II and III nuclear materials and during storage incidental to international nuclear transport. Article 4(1,2) of the CPPNM states that each State Party cannot export or authorize export of a nuclear material and cannot import or authorize the import of nuclear material from a State not party to the Convention unless assured that the international nuclear transport will be protected at the levels as described in Annex I. Article 4(3) requires States to receive these assurances from States not party to the Convention to “allow the transit of its territory by land or internal waterways or through its airports or seaports of nuclear material.” [1]

The Code of Conduct on the Safety and Security of Radioactive Sources was approved by the IAEA Board of Governors in September 2003 and provides guidance to States on how to safely and securely manage radioactive sources that can pose a significant risk [4]. The Code is not legally binding but has received political support from over 130 Member States [3]. Paragraphs 23-29 of the Code provides guidance to Member States on the import and export of Category I and II radioactive sources.

In September 2004 the IAEA Board of Governors endorsed the Supplementary Guidance on the Import and Export of Radioactive Sources. The Guidance, which is a supplement to the Code, was developed to address ongoing concerns regarding the import and export of radioactive material not covered in other documents and provides an adequate transfer of responsibility when radioactive material is being transferred from one State to another. The expectation is for States to consider this Supplementary Guidance in conjunction with their national legislation and international commitments when considering whether to authorize exports and imports of Category 1 and 2 sources [4]. The Guidance does not apply to nuclear material covered in the CPPNM, except for sources incorporating plutonium-239, and radioactive sources within military or defense programs [4].

### **Other UN Legal Instruments**

- *ICSANT (International Convention on the Suppression of Acts of Nuclear Terrorism)*

The ICSANT Convention opened for signature 14 September 2005 and entered in to force 7 July 2007. The overall emphasis that ICSANT adds to the CPPNM/A is a focus on criminalization of

activities. There are currently 114 State Parties to the Convention. The Convention was initially drafted by the Russian Federation to address gaps and shortcomings in the CPPNM/A for specific terrorism related issues [5]. There was an emphasis on nuclear terrorism prevention and was designed as a pre-emptive instrument, especially in relation to the perceived weaknesses of the CPPNM/A to prevent non-state actors from obtaining material to use in a dirty bomb [6]. In particular, the Convention provided a wider definition of materials and facilities, covering both military and peaceful facilities, requires the criminalization of planning, threatening, or carrying out acts of nuclear terrorism, and requires States to prevent and counter preparations for terrorism.

The Convention obligates State Parties to cooperate in preventing and prosecuting acts of nuclear terrorism. States are required to adopt legislation and regulations protecting nuclear material, installations, and devices, including requiring the implementation of access prevention. However, the Convention is only as useful as the strength of individual State legislation and regulations. ICSANT requires that nuclear transport is secure and, for international transfer, requires adequate transfer of security responsibilities from one State to another. Again, the Convention has little in the ways of specifics, but only that acts ought to be criminalized. Implementation varies from State to State, especially in terms of how they are enforced in each State.

- *United Nations Security Council Resolution (UNSCR) 1540*

The goal of UNSCR 1540 is to prevent non-state actors' access to WMD materials and their means of delivery, including chemical, biological, nuclear WMD [7]. This resolution is under Chapter VII of the United Nations charter, so it is mandatory for all UN members, but it does not authorize the use of force. The resolution mandates that all UN member states adopt legislation and enforce laws to prohibit non-state actors from manufacturing, acquiring, possessing, developing, transporting, or using WMD and their means of delivery. States are also required to develop and maintain physical protection measures, border/export controls, and law enforcement mechanisms to address WMD trafficking. These are supply-side methods to prevent proliferation [8].

Specific to nuclear transport, UNSCR 1540 mandates that States adopt regulations controlling physical protection of materials in transport, as well as reviewing national exports of WMD and related materials (including chemical weapon precursors and biological agents), as well as continuity of knowledge on international shipments of materials. While UNSCR 1540 requires that States implement legislation and regulation to “develop and maintain appropriate effective physical protection measures” to guard their nuclear material and nuclear facilities, the Resolution does not prescribe the characteristics required to be adopted by States [9]. Therefore, while a great number of States have legislation and regulations in place related to nuclear transport, their implementation and effective oversight will vary greatly. Figure 1 illustrates the existing IAEA and UN frameworks in place with a brief description for each Convention.

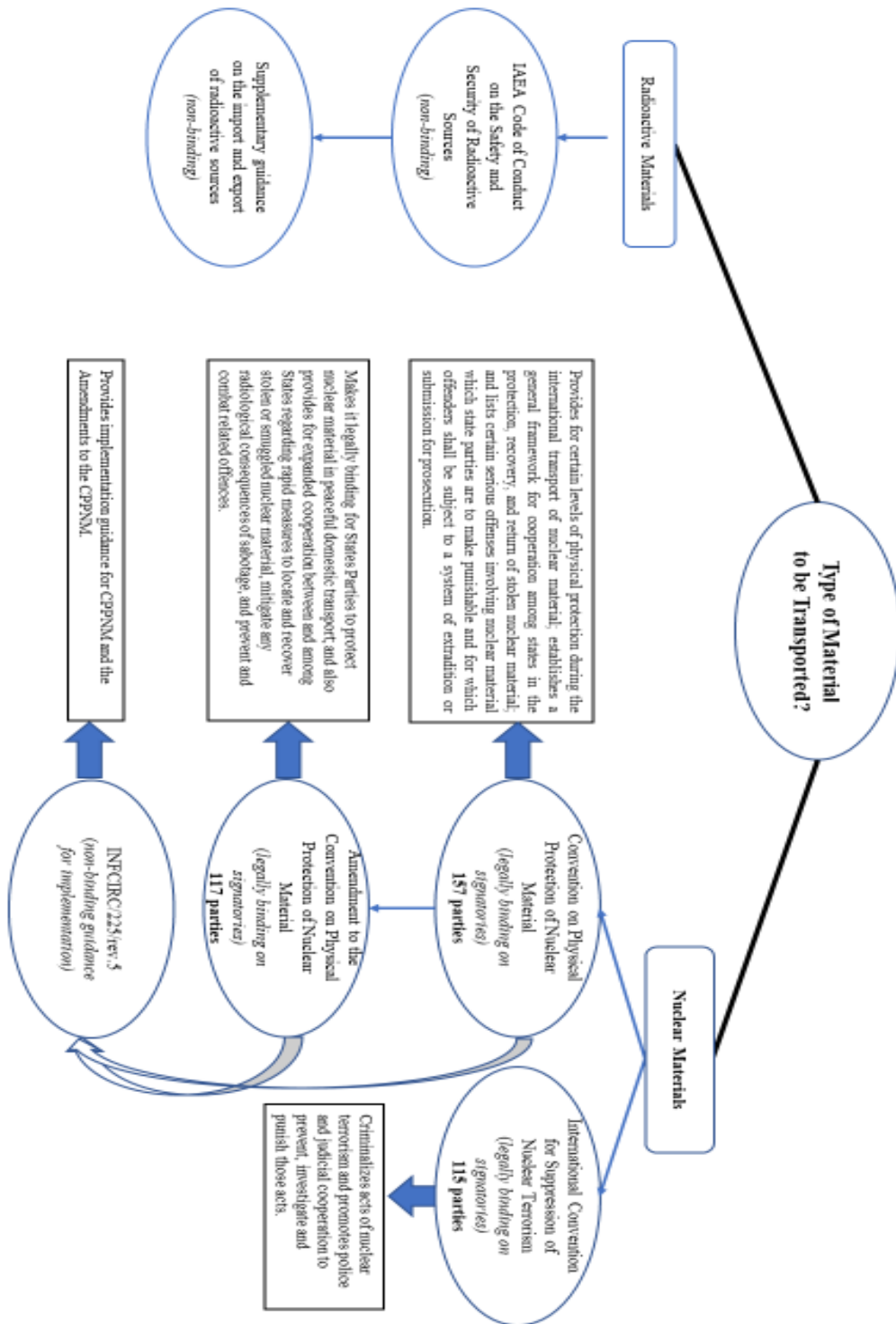


Figure 1: IAEA and UN Instruments on Security for Nuclear and Radioactive Materials. Source: [19].

## **MODAL-DEPENDENT LEGAL INSTRUMENTS**

Outside the IAEA legal instruments and those UN instruments discussed in the previous section, other transport organizations within the United Nations regulate transport security in their particular mode. Specifically the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO) regulate the transport of dangerous goods in the maritime and aviation domain respectively. Before proceeding further, it is important to recognize other organizations, including but not limited to the UN Sub-committee on the Transport of Dangerous Goods (UN-TDG), the International Air Transport Association (IATA), and the Comité Maritime International (CMI) as organizations also interested in the safety and security of dangerous goods in transport.

- *The International Maritime Organization*

Within the maritime transportation space, the IMO is the primary UN organization responsible for safety and security of maritime vessels transporting goods, including those of Class 7 material. Starting with the Safety of Life at Sea (SOLAS) Convention of 1974 and subsequent amendments, SOLAS has identified areas of concern for maritime security, including vessel and port facility measures [10]. Subsequent to SOLAS and in the aftermath of the hijacking of the *Achille Lauro*, the IMO and its Member States subsequently passed the Suppression of Unlawful Acts against the Safety of Maritime Navigation (SUA) Convention in 1988 [11]. Under the provisions of SUA, Member States are required to act against individuals committing unlawful acts against vessels, including the seizure of vessels by force, acts of violence against persons on board, and placing devices on vessels with likelihood of causing damage or destruction. The Convention provides for punishments and extradition mechanisms for those individuals who committed acts in violation of the convention [11]. As of today, 196 states ratified the Convention, equating to 94% of the world merchant shipping tonnage [11].

Within the SOLAS Convention and subsequent Amendments, the IMO has developed specific codes for maritime security and the carriage of dangerous goods. Starting with the International Maritime Dangerous Goods (IMDG) Code, the IMO prescribes specific guidelines from stowing, segregating, and ensuring the safe and security transport of all nine classes of dangerous goods [12]. Specific to Class 7, the IMDG code goes into detail as to the safety requirements for transporting Class 7 material, with Chapter 1.4 discussing security provisions for dangerous goods transport. Under section 1.4.3.1.3 of the Code, the IMO lists those radioactive isotopes of high consequence and their activity values. This table corresponds to the table found in Nuclear Security Series No.9 on the transport security of radioactive materials. Of interest is the provisions of 1.4.3.2.2 and 1.4.3.2.3 which discuss transport security and the alignment of the IMDG Code to that of the CPPNM and CPPNM/A[Z]. While 1.4.3.2.3 provides a pass-through for compliance of 1.4.3.2.2 based on compliance with the CPPNM, the actual implementation becomes unclear and subject to individual interpretation by the countries.

Following the events of September 11, 2001, the IMO developed the International Ship and Port Facility Security (ISPS) Code. The ISPS Code goes into detail describing the security procedures for port facilities, vessels, and assigning responsibilities for security to individuals involved in maritime transport. As part of the ISPS Code implementation, each of the parties

internalize the ISPS provisions into their national law. For example, in the United States, the ISPS code implementation comes in the form of the Maritime Transportation Security (MTSA) Act [13]. As part of the implementation, the MTSA provides procedures for ensuring security of Certain Dangerous Cargoes (CDC), which under U.S. law includes Class 7 [13]. These security provisions include the role of guards and securing material while at facilities [13].

- *The International Civil Aviation Authority*

Similar to the IMO, ICAO has developed security procedures for the safe and secure transport of dangerous goods on airplanes. One of ICAO’s primary conventions is the Chicago Convention. The Chicago Convention establishes rules of airspace, aircraft registration, and safety, and details the rights of the signatories in relation to air travel. The Convention is supported by nineteen annexes containing standards and recommended practices; where Annex 17 addresses security, and Annex 18 addresses the safe transport of dangerous goods. The ICAO Technical Instructions for handling dangerous goods, similar to the IMDG Code provides similar provisions for stowage, handling, and segregation of hazardous materials, including Class 7 [14]. These annexes plus the Technical Instruction document form the foundation for the IATA Dangerous Goods Regulation (DGR) [15].

## REGIONAL CONSIDERATIONS

Additionally, certain regions of the world developed specific regional conventions for handling the transport of dangerous goods. Europe has developed three conventions focused on the safe and secure transport of dangerous goods by road (ADR), rail (RID), and inland water (ADN). Table 1 lists the countries party to each of the conventions. While most of the signatories are in Europe, both ADR and RID have signatories from the Central Asia (Azerbaijan, Georgia, Kazakhstan and Tajikistan) and Northern Africa (Algeria and Morocco).

**Table 1: Signatories to Regional Transport Conventions.**

ADR		RID		ADN
Albania	Lithuania	Albania	Macedonia	Austria
Andorra	Luxembourg	Algeria	Monaco	Belgium
Austria	Macedonia	Armenia	Montenegro	Bulgaria
Azerbaijan	Malta	Austria	Morocco	Croatia
Belarus	Moldova	Azerbaijan	Netherlands	Czechia
Belgium	Montenegro	Belgium	Norway	France
Bosnia and Herzegovina	Morocco	Bosnia and Herzegovina	Poland	Germany
Bulgaria	Netherlands	Bulgaria	Portugal	Hungary
Croatia	Nigeria	Croatia	Romania	Italy
Cyprus	Norway	Czechia	Serbia	Luxembourg
Czechia	Poland	Denmark	Slovakia	Moldova
Denmark	Portugal	Estonia	Slovenia	Netherlands
Estonia	Romania	Finland	Spain	Poland
Finland	Russia	France	Sweden	Romania
France	San Marino	Georgia	Switzerland	Russia
Georgia	Serbia	Germany	Tunisia	Serbia
Germany	Slovakia	Greece	Turkey	Slovakia
Greece	Slovenia	Hungary	Ukraine	Switzerland
Hunary	Sweden	Iran	United Kingdom	Ukraine
Iceland	Switzerland	Ireland		
Ireland	Tajikistan	Italy		
Italy	Tunisia	Latvia		
Kazakshatn	Turkey	Lichtenstein		
Latvia	Ukraine	Lithuania		
Liechtenstein	United Kingdom	Luxembourg		

Sources: [16], [17], [18]

To summarize the different modal and regional conventions, Figure 2 provides a graphic focused on specific mode of transport.

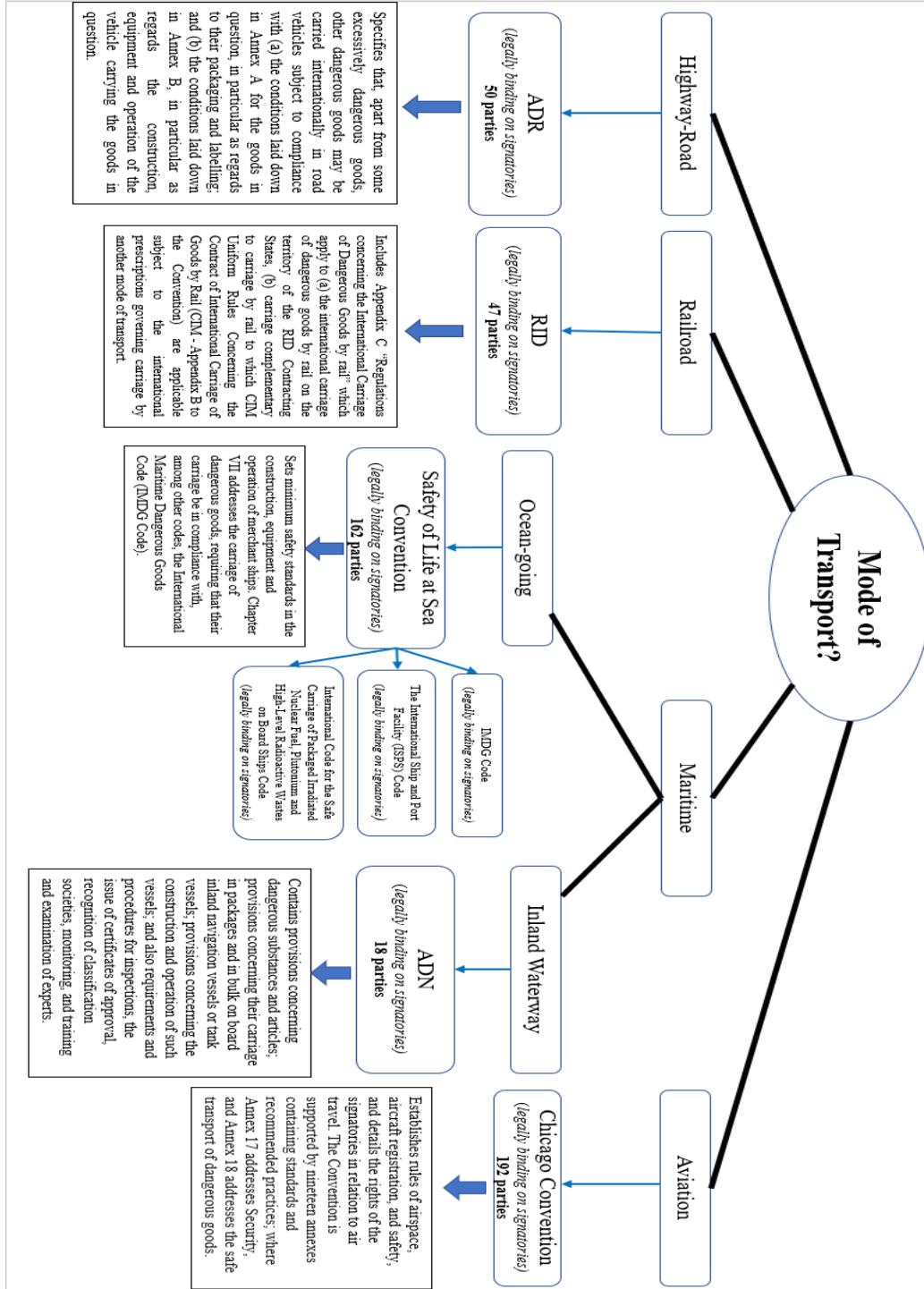


Figure 2: Modal and Regional Conventions for Transport Security. Source: [19]



## **WEAVING THE TAPESTRY FOR REGULATORY DEVELOPMENT**

Regulatory development for the secure transport of nuclear and other radioactive materials is complex. The paper describes a complex tapestry of conventions, agreements, guidance, and other documents to ensure the secure transport of material, across multiple modes, through transboundary movement, and with multiple stakeholders. As competent authorities endeavor to draft their regulations, the legal awareness of multiple organizations is paramount. This paper provides merely a survey of the existing international legal landscape. It does not seek to answer the challenges of harmonization and integration across multiple conventions. However, by identifying the legal instruments and areas of guidance, the hope is that both legal and technical professionals in countries work together both domestic and internationally to address these issues.

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