The return of space objects: legal annotations and practical experience

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A rescue or a return agreement?

• Reference to Outer Space Treaty “which calls for the
  – rendering of assistance to astronauts (Art. V OST)
  – prompt and safe return of astronauts (Art. V OST)
  – return of objects launched into outer space” (Art. VIII OST)

• “prompted by sentiments of humanity”

• Five ‘material’ articles: only one deals with ‘objects’
Relevant terms

- **Launching authority** “shall refer to the State responsible for launching”
  - “territorial limits of the Launching Authority”
- **Space object** or its **component parts**
- Objects launched into outer space or its component parts
Art.5 ARRA: obligations of the “finder”

• Para.1 – **notification** obligation:
  – Launching Authority and UN Secretary-General

• **Upon request** of the Launching Authority:

• Para.2 – “take such steps as it finds practicable to **recover** the object”
  – with assistance of L.A.!

• Para.3 – **return** object or **hold** object at disposal
Art.5 ARRA: obligations of the “sender”

• Para.3 – **furnish identifying data** prior to return
• Para.4 – immediately take effective steps to **eliminate possible danger** or harm
  – under **direction & control** of finder
• Para.5 – **bear expenses** incurred in fulfilling recovery and return obligations
Intergovernmental Organizations

- Art.6 ARRA – ‘Launching Authority’ may also refer to an IGO provided that:
  - IGO declares acceptance of rights and obligations (unilateral act, IGO does not become ‘contracting party’)
  - majority of IGO Member States are parties to ARRA and OST
- ESA declared acceptance of ARRA in 1975 (1st IGO)
ESA’s practical experience with the ARRA

- First flight of European VEGA launcher (VV01), 13 Feb 2012 from CSG, French Guiana
- VEGA AVUM upper stage shut-down in orbit of 400x1400km at 69.4deg inclination
- Uncontrolled re-entry within 25 years orbital lifetime in line with international standards
VV01 AVUM tank return

• Uncontrolled VEGA AVUM (COSPAR ID 2012-006K) atmospheric re-entry 02Nov2016
• Objects retrieved in the Tamil Nadu province of the Republic of India in November 2016
• COPV (composite overwrapped pressure vessel) gas tank with Titanium shell
  – one of the stage’s components expected to survive re-entry
Identification of object (c.f. Art.5.3 ARRA)

• **Information exchange** inter alia through international cooperation under the Inter-Agency Space Debris Coordination Committee (IADC)

• **Technical analysis** (orbital decay, atmospheric re-entry incl. re-entry corridor, break-up properties etc.)
Hazard analysis (c.f. Art.5 para.4 ARRA)

• no specific hazardous materials listed by supplier
• no specific hazards present on the tank before propellant/oxidizer loading
• ESA’s re-entry break-up assessment revealed that no fluids were to be expected in retrieved tank fragments
• Confirmation of non-toxicity of the objects
Legal appraisal (1): Applicability of ARRA

• The Republic of India is a State Party to the ARRA.
• ESA, through Declaration ESRO/AF(75)58 adopted on 25 June 1975, declared acceptance of the ARRA in accordance with Art. 6 ARRA.
• It follows that both parties are subjects to the rights and obligations provided for in the ARRA.
Legal appraisal (2): Subsumption

• Retrieval within territory of the Republic of India
• Tanks constitute component parts of the AVUM upper stage of the VEGA launch vehicle
• VEGA launch effectuated under the ESA VEGA small launcher development programme, with ESA as the responsible Launching Authority
Legal appraisal (3): Ownership

• “The Agency, acting on behalf of the participating States, shall be the owner of the satellites, space systems and other items produced under its programmes”
  – (Annex III, Art. IV ESA Convention)

• reiterated under Art.9 Implementing Rules of the ESA Small Launcher Development Programme

• **ESA is owner** of the VEGA VV01 launch vehicle including its component parts
Successful return to ESA

• **Exchange of notes** between ESA and ISRO with reference to the ARRA and the ESA-ISRO ‘Cooperative Agreement’
• **Excellent cooperation** with Indian authorities throughout the recovery, identification, storage and return
• **What is the interest in returning a burned tank fragment?**
  – **atmospheric break-up analysis** (aerodynamic / -thermal effects)
Concluding remarks

• Return of the ESA AVUM tank: a practical case of applying the ARRA

• International law as embodiment and enabler of international cooperation in space activities
  – provides a normative frame and procedural aspects

• ARRA: 50 years old ... yet modern
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