

Ethics in Space Research

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1. 'Research'?



- Large variety EU research projects related to space (research)
 - Development of space(-related) infrastructure – Galileo, GMES, SSA?
 - Use of space-generated 'products' (data, PNT info) downstream – GNSS services; GMES services; meteo data
 - Technology research, incl. space
 - Space research more properly speaking: radio-astronomy etc.

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1. Law & ethics



- **Two** functions of ‘the law’:
 1. Promote / realize ‘justice’ & ‘equity’ \leftrightarrow *ethics*
 2. Enhance foreseeability of human actions
- Differences law \leftrightarrow ethics:
 - Law is much more rigid: once duly established, it can only be changed by following formalized procedures part of the law itself – otherwise = *‘revolution’*
 - Authority to establish binding law also determined in formal manner (e.g. democracy)

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2. Space law ...



- 1967 Outer Space Treaty: framework
 - + Four elaborating UN Conventions
 - + General public international law also applicable
 - ◆ Peaceful purposes; non-discrimination; 'solidarity' with developing states; international cooperation; good faith negotiations; human rights ...
 - ITU for usage orbits & radio frequencies
 - ◆ Equitable access; 'solidarity' with developing states
 - Specific legal frameworks (ISS; ESA)
- ↔ Focus on **activities in outer space**

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2. ... & research



- Scientific research major issue in OST
 - ‘Freedom of exploration’; ‘international sharing of scientific results’; ‘for the benefit of mankind’
 - ITU: reserves frequency bands for radio astronomy
 - Otherwise: space research legally speaking \approx completely falling within sovereign national domain
- ➔ Classified info nationally controlled

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2. Research practice



- Sharing of moon rocks (Cold War!)
- Joint research activities on board ISS & in many bilateral contexts
- Sharing EO data in case of natural / man-made disasters
- International community of space scientists: COSPAR, IAA, even OECD
 - I.a. planetary protection

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3. Accountability ...



1. Responsibility *of states*

- Under OST for 'internationally wrongful act'
- ➔ Which international obligations are violated?
- ➔ General international law: 'not to harm thy neighbour' – **within reasonableness** ...
 - ◆ Cases against NOAA for absent tsunami warnings
- Exploration (& use): int'l cooperation, mutual assistance, consultation & information, respect for environment

3. ... malevolent use



2. Liability *of states*

- For damage **caused by space objects**
= Generally taken to mean '*physical*' damage caused by *collision*

↔ Damage caused by wrongful GNSS signal / wrongful EO information

➔ Damage caused by research??

↔ **Malevolent** use subject to general national *tort / criminal law* ...

Note: legal problems of proof & attribution

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3. Practice – satnav



■ GPS & GLONASS

- Run by respective militaries
- Only standard signals openly accessible ↔ encrypted military signals reserved to military
- No (real) liability acceptance

■ Galileo

- Complicated governance structure
- Same standard signals – *plus* encrypted PRS
- Willingness to consider liability acceptance
 - ◆ Fault? Absolute with reversed burden of proof?

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4. Privacy & access



- Freedom of EO (in principle)
 - ↔ Potential privacy interference
 - Essentially matter of national law, except as...
- Human right
 - International: Declaration & Covenant
 - European Convention on Human Rights (incl. European Union)
- To be protected against undue access
 - Dir. 95/46, 97/66 & 2002/16; Reg. 45/2001



4. 'Real life case' ...



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5. Dual-use issues



- Export controls
 - Int'l: MTCR & Wassenaar – but not binding law
 - US: ITARs – plus national liability for violations
 - EU: Reg. 428/2009 – with ESA exception!
 - ◆ Community General Export Authorization
 - ◆ Beyond that still national control
 - ↔ General focus: hardware, software & technology / know-how at security-sensitive levels ↔ *space research* ?
 - & Generally, ethics taken care of by broad scope regulation – at national level

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6. Informed consent



- ISS: matter of space agencies
 1. US: licensing of sub-orbital operators
 - Knowledge of use non-US-certified vehicle for sub-orbital spaceflight required for passengers
 2. Dir. 95/46: personal data
 - Difference data obtained with knowledge of data subject & data not so obtained; data obtained from data subject itself & data not so obtained
 - Limited to necessity in state of law for clearly determined & justified purposes, & per *statute*

Concluding remarks



- Some ethical concerns seem to be \approx well covered by legal issues; others seem to be not yet addressed – because not realistic?
- Wherever addressed, usually at national (law) level
- Question for EU as to harmonization

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