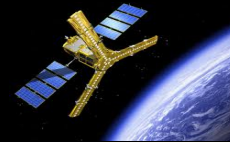


Satellite Remote Sensing for Environmental Monitoring and Regulation

Fiona Cawkwell and Ned Dwyer,
University College Cork



F. Cawkwell and N. Dwyer (f.cawkwell@ucc.ie)
Remote Sensing and Environmental Monitoring

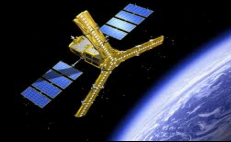


Civilian Earth Observing satellites operational for 40+ years

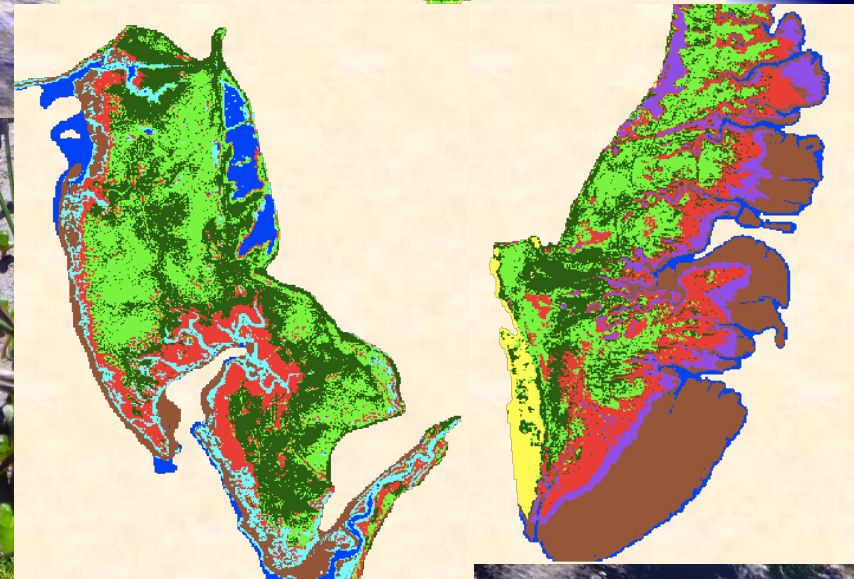
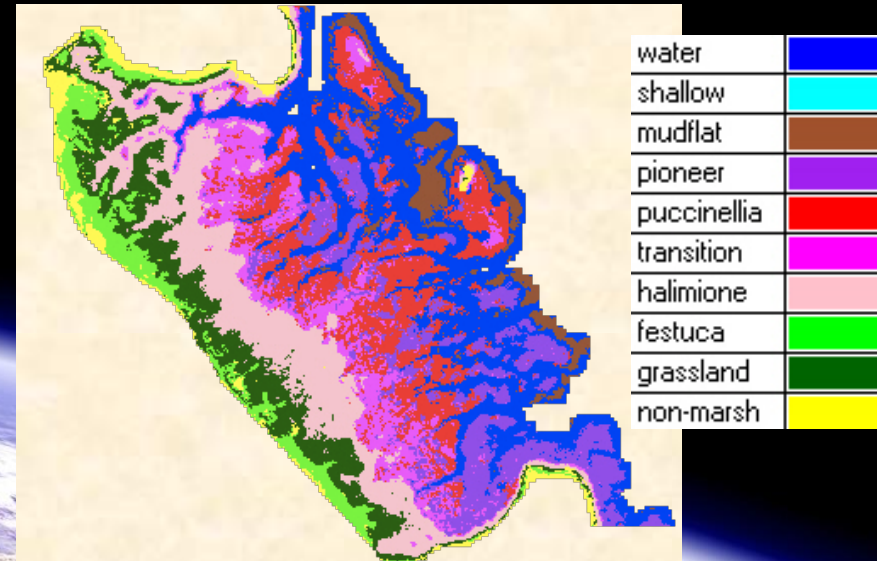


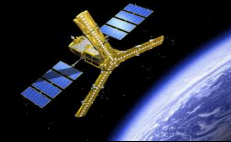
June 9th 2013

F. Cawkwell and N. Dwyer (f.cawkwell@ucc.ie)
Remote Sensing and Environmental Monitoring

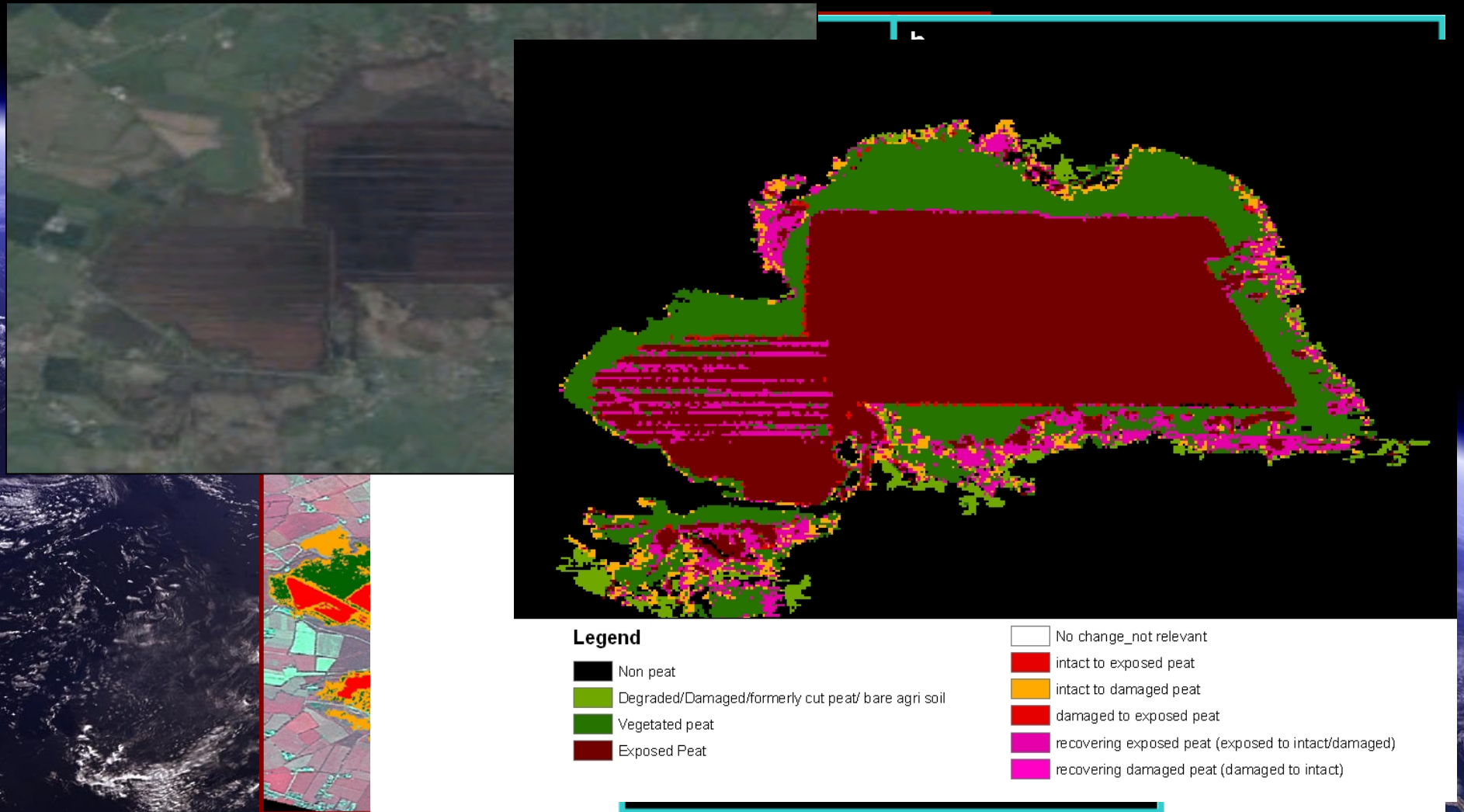


Vegetation habitats from satellites

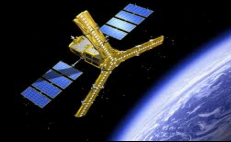




Change over time from satellites

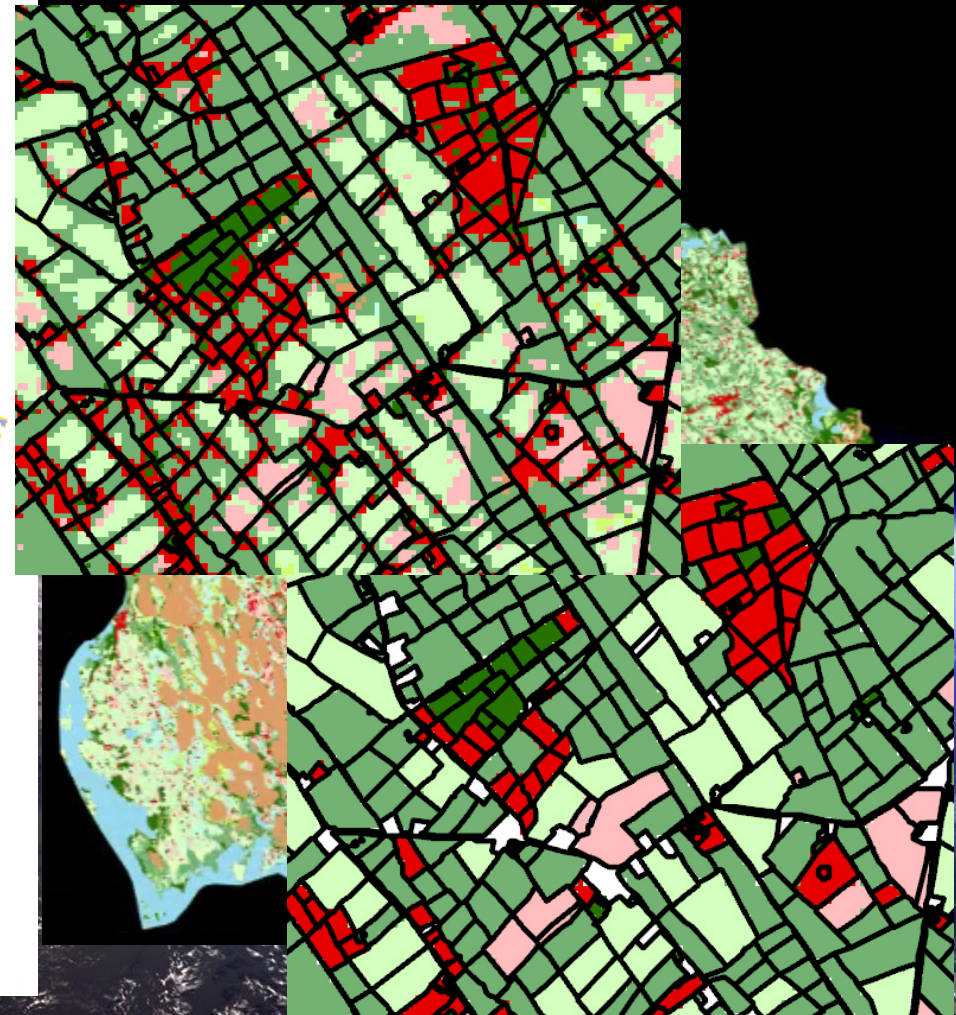
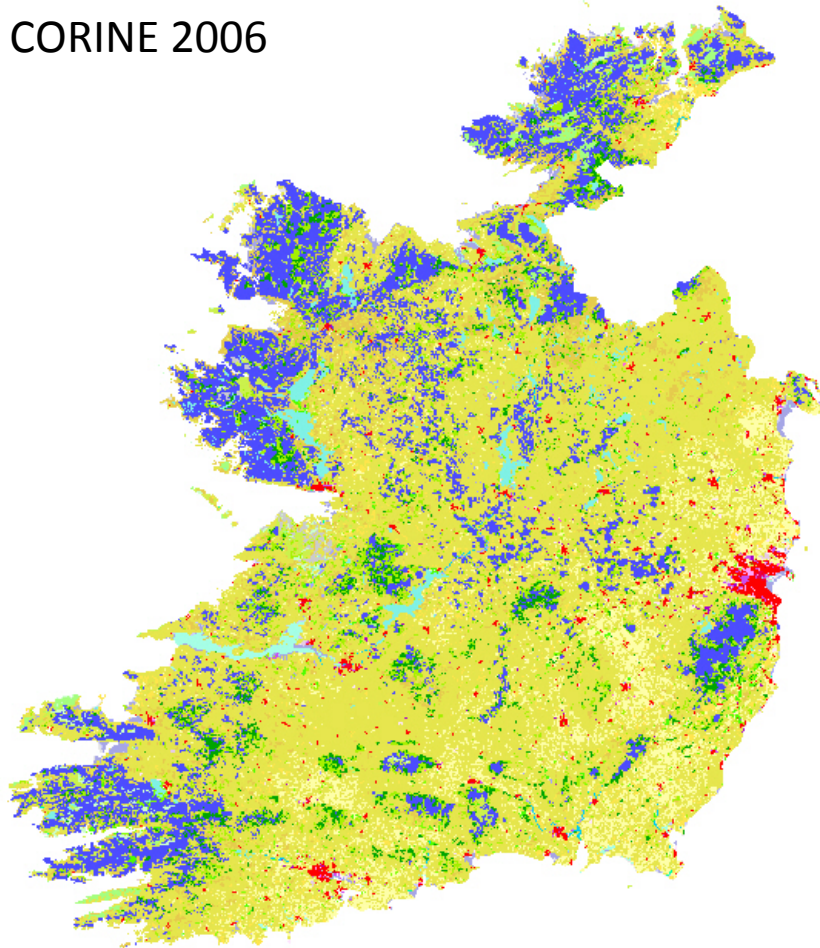


F. Cawkwell and N. Dwyer (f.cawkwell@ucc.ie)
Remote Sensing and Environmental Monitoring

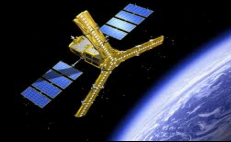


Mapping landcover from satellites

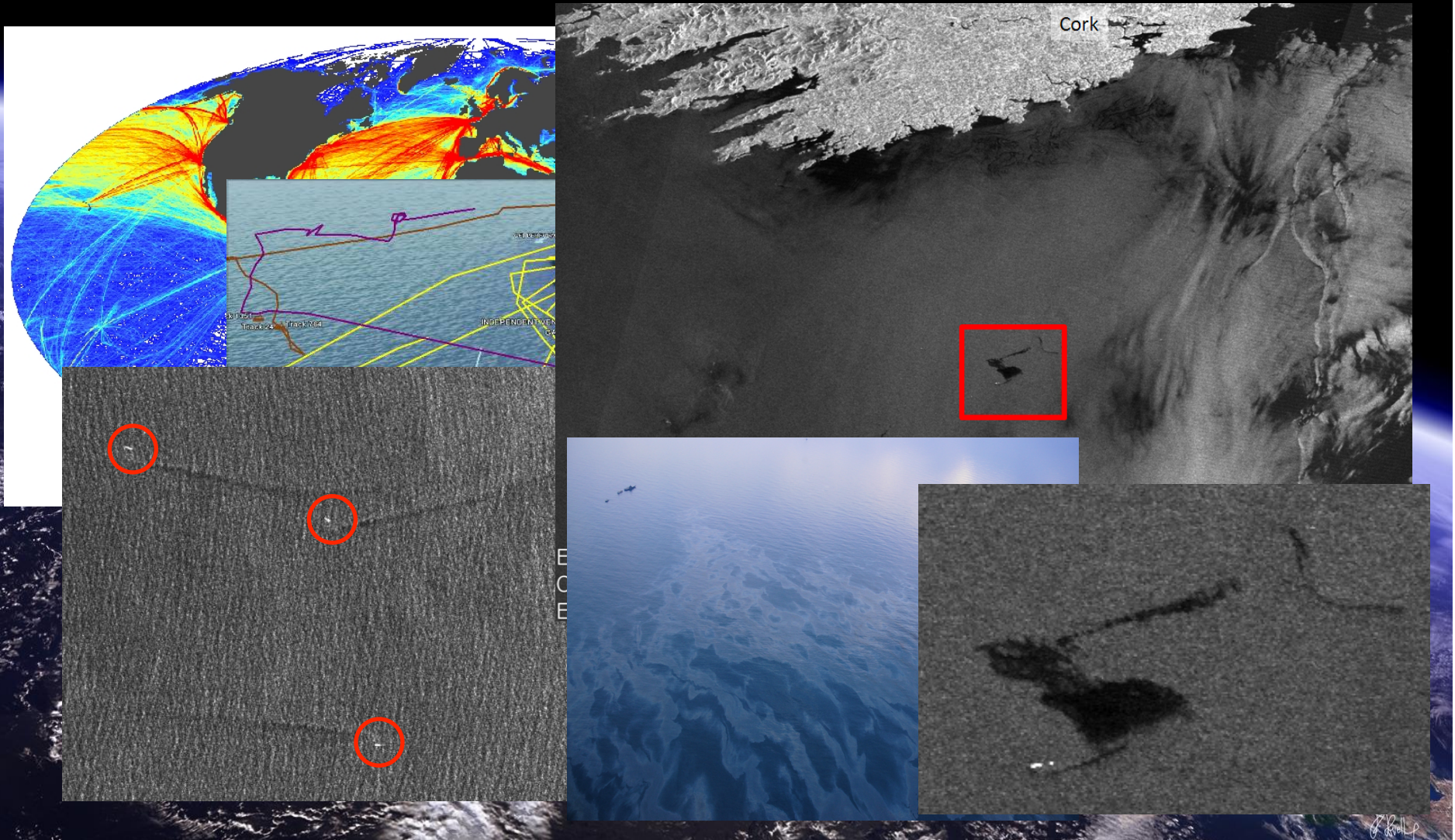
CORINE 2006



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The marine environment from satellites





Limitations of satellites for operational monitoring purposes

spatial resolution – few sensors higher than 5m

temporal resolution – trade-off with spatial resolution

spectral resolution – cannot record all details

long time series datasets – only Landsat with 30+ years

reliability – cloud cover, non-acquisition, satellite failure

expense – higher resolution sensors are commercial

skills – requires trained image processors



Potential of satellites for operational monitoring purposes

objective, repeatable, timely, rapid, archived, global

growing number of sub-metre sensors

imminent launch of more (including microwave) sensors

development of satellite constellations

growth in computing and visualisation power

increase in knowledge and awareness

recognition within a legal framework



Satellite Remote Sensing and legal recognition

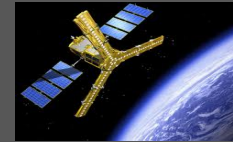
at present very few laws allow for use of satellite data in a monitoring context with the exception of some agriculture and fisheries examples

most successful courtroom use of satellite imagery in Australia under the vegetation clearance legislation

UK example where defendant convicted of illegal waste management and imagery showed non-compliance

UK example where historic imagery used to prove burning for longer period than investigators believed

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Satellite Remote Sensing and legal recognition

absence of case law precedents

need for education of law enforcers

need for interaction between technical and legal experts

need for international rules, standards and best practice

need for ground evidence to support satellite data

look to other areas for guidance e.g. use of CCTV,
International Charter on Space and Major Disasters



Conclusions

satellites allow for rapid data collection and dissemination on a global scale

decades of experience in environmental applications

potential legal, technical and economic constraints but not insurmountable

satellite technologies influence potential criminal behaviour – deterrent on panopticon principle

growth in Unmanned Aerial Vehicles for targeted image acquisition (privacy and ethical issues?)

F. Cawkwell and N. Dwyer (f.cawkwell@ucc.ie)
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Friends of the Irish Environment



Environmental Protection Agency



European Space Agency



Thankyou and Questions