SIRIUS
SPACE, BUSINESS & LAW

6èmes rencontres « DROIT et ESPACE »

L'industrie spatiale face aux nouvelles dynamiques du marché mondial

New Space ? Vieux continent ?
Défis et opportunités pour l'industrie spatiale en Europe

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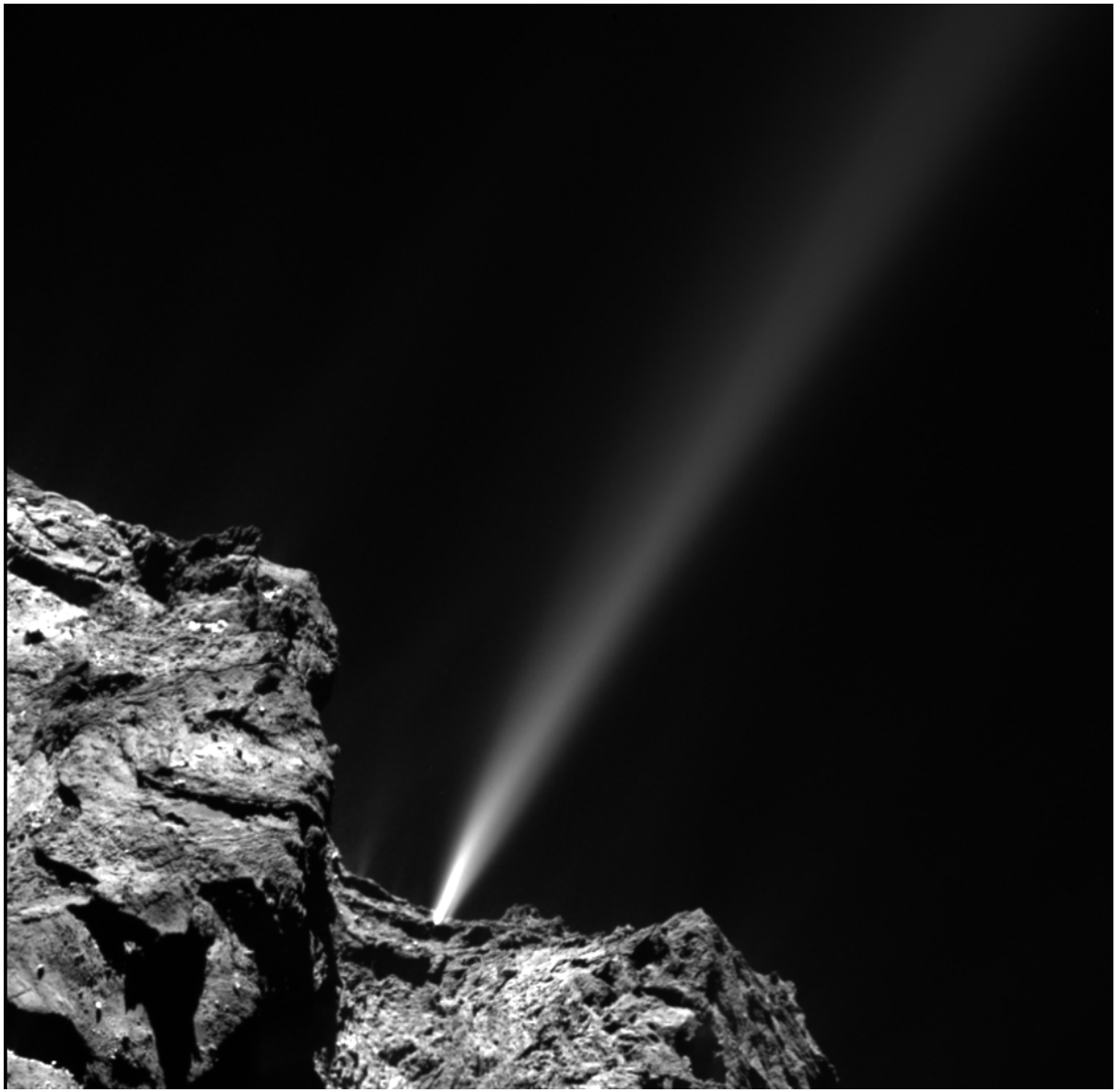
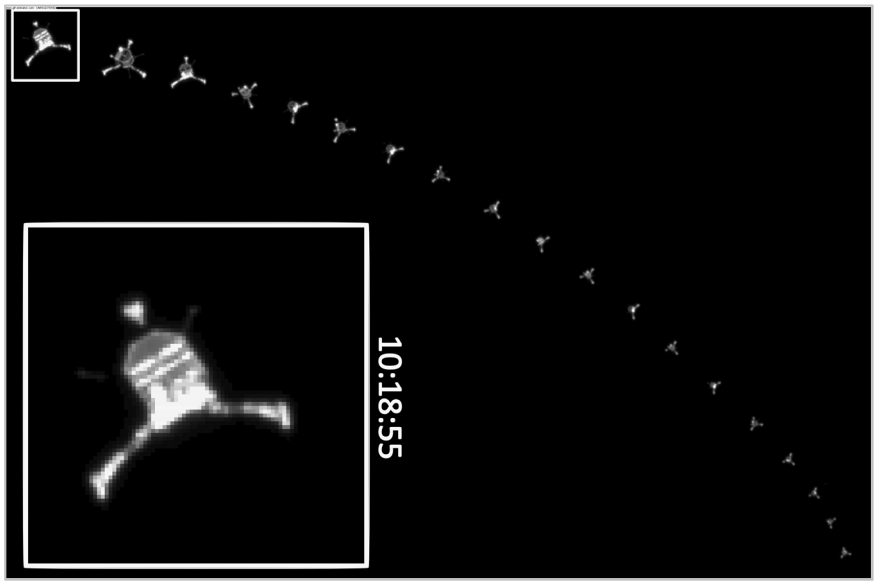
New space? Where?

New space: Here in Toulouse with Monsieur Jourdain…

Space: Europe is able to go very far





A wind of change above atmosphere?

- **Pressure on institutional budgets**
- **Harsh international competition**
- **New players (US, Europe, BRICS and GAFA)**
- **New business models (services, B2C, vertical integration)**
- **No level-playing field between US and Europe**
- **New and challenging needs (more expensive)**

Challenges for large European players:

- Find new growth opportunities
- Improve competitiveness and agility
- Don‘t start from scratch: products, work force, customer base
- Remain clear-headed: « buzz » or real trends

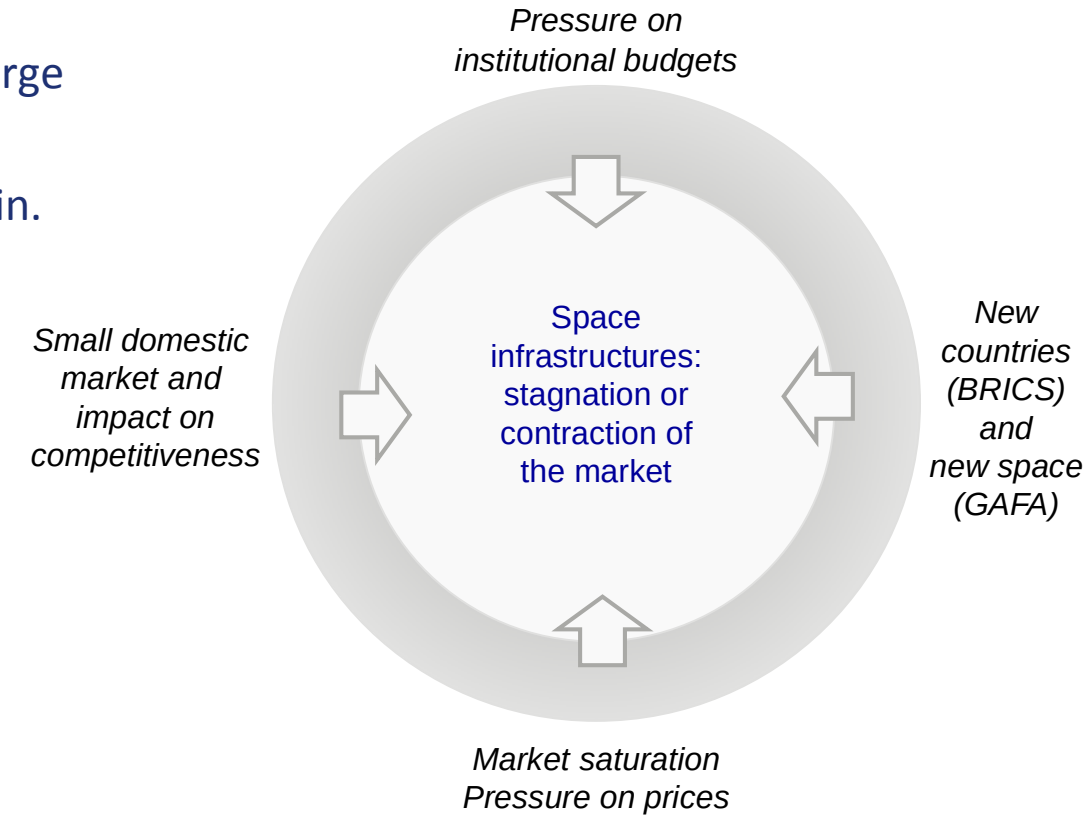
The usual suspects and the new players

The usual suspects:

- A small number of large industrial players
- and their supply chain.

Their customers:

- National and European agencies,
- Satcom operators,
- MOD,
- Export



New profiles (David & Goliath):

- Start-ups with VC, betting on the development of very small satellites.
- The big players (GAFA) of the Web sphere, able to invest massively.

New business models:

- Scalability and agility
- Media / Advertising
- B2C
- Vertical integration
- Position in value chain

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The development of services: the new El Dorado ?

The devil in the details…

Niche markets or global footprint

The user is not the customer (with funding)

Aggregation ≠ "fit for purpose"

Need for appropriate data policies

Few anchor tenancies or framework contracts

Fragile business cases (for PPP/PFI)

Free-rider model

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New space: Silicon valley's good old recipes

Business fundamentals…

Until now…	**New Space?**
– Funded by governments, space agencies and large operators.	– Venture capital and private funding.
– Low Internal Rate of Return (IRR).	– High IRR expected.
– Low production rate (typically 10 satellites or launcher produced per year)	– High production rate (hundreds of satellites per year, dozens of launches per year).
– High cost per unit.	– Low cost per unit.
– Industrial scheme constrained by political decision and rules (e.g. geo-return).	– Industrial set-up optimized for mass production.
– Very high reliability.	– System reliability ensured by replacement of satellites.
– Focus on B2B and B2G markets.	– Main focus on B2C markets.

Facts… ***and promises***

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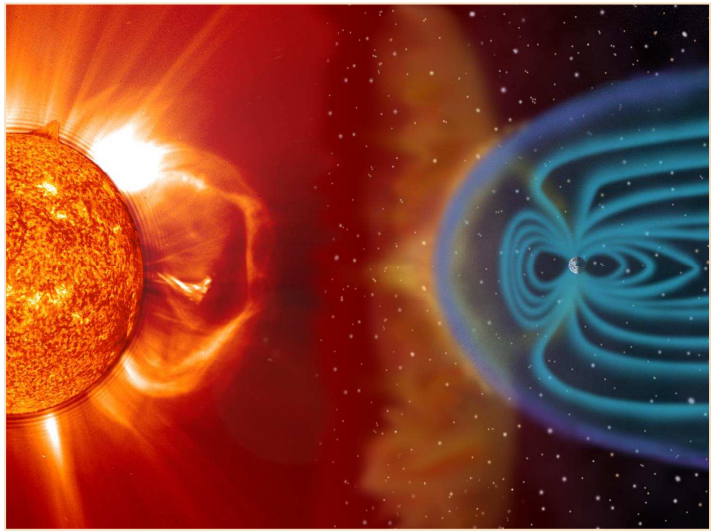
New space? But old laws of physics still apply…

Access to space

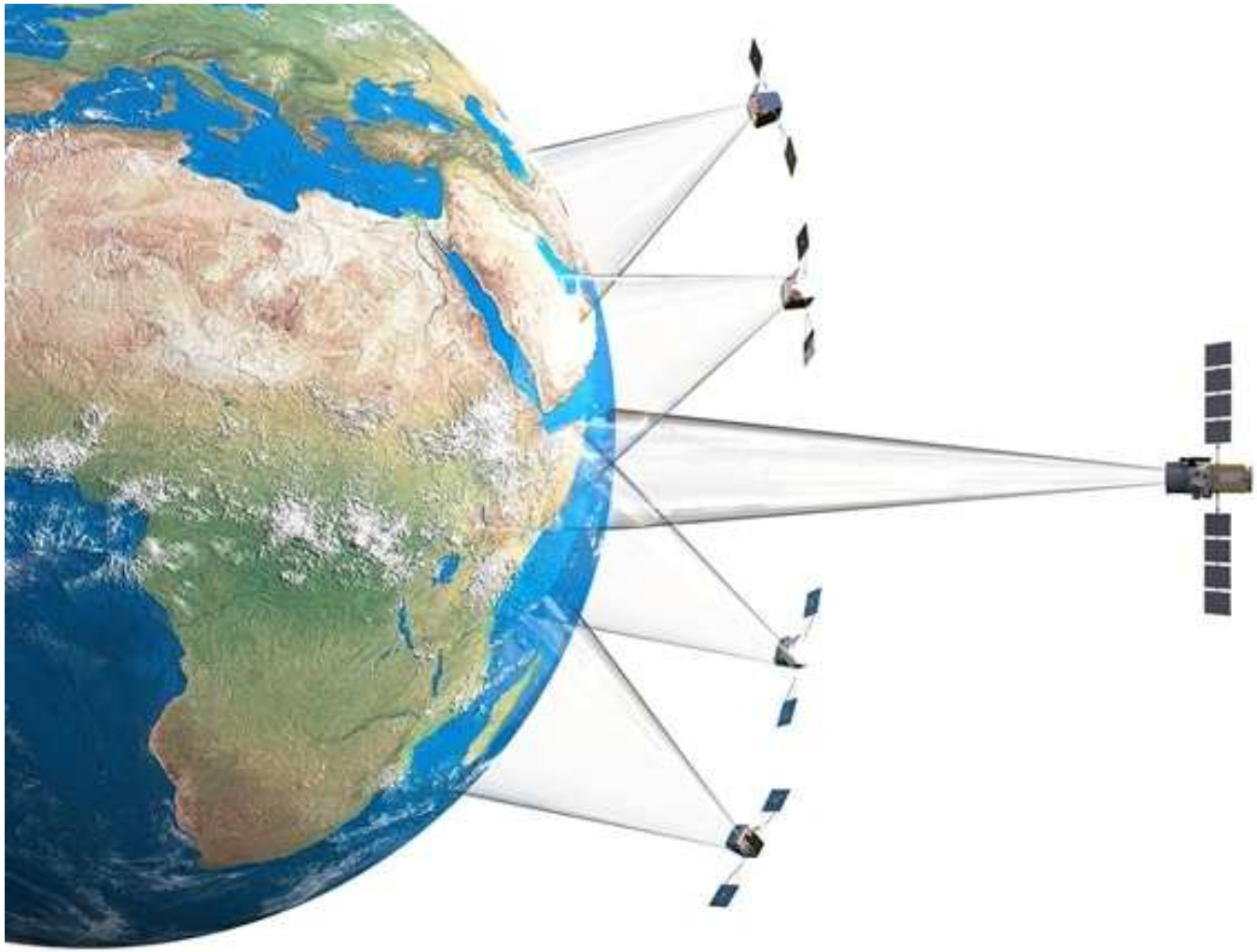


Space environment

and… no pit stop

New paradigms?

New space? New orbits, new frequencies?

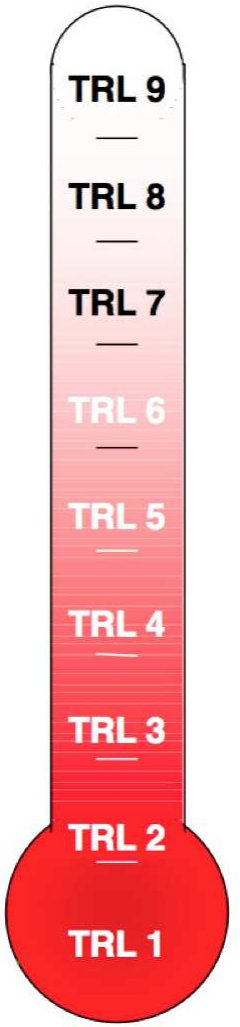


- **Core demand: video broadcast (UHD), mobility.**
- **New business: M2M, in-flight connectivity, etc.**
- **ITU coordination. Potential interferences.**
- **Affordable access to space.**
- **Small is beautiful but is it cheaper?**
- **“GEO is cool”**

Innovation in space: finding the right balance…

An apparent contradiction…

- **R&T/R&D and Innovation: a second nature in space activities:**
  - **A great deal of challenges** in science and space exploration.
  - **Intrinsic difficulty of problems** (access to space, constraints of the space environment, reliability and life duration, performance, autonomy, etc.)
  - **Relatively small size of recurrent production**…
- **Customers and program managers are often reluctant to use new or disruptive technologies:**
  - **Technology Readiness Level**: main selection criterion for operational or critical missions.
  - **Product approach**: radical changes are difficult. Focus on product evolution.
  - **Incremental innovation**: less visible, sometimes more efficient.
- **Excellence in technology remains a key success factor of space activities**



Three all-electric satellites ordered in less than a year

- **Electric propulsion:**
  between product improvement and disruptive approach
  - **Initial orbit raising and all on-orbit manoeuvres**.
  - **Disruption**: much larger payload (x 2).
    Launch in lower position.
  - **Product improvement**: electric propulsion used for station-keeping for 10 years on Eurostar E3000 satellites.
  - **Time from GTO to GEO orbit: 3 to 6 months**

Eutelsat-172B	3 payloads: C-band (14 transponders), Ku-band (36 transponders) and a high throughput payload (1,8 Gbps)	3500 kg / 13 kW
SES-12	76 active transponders in Ku and Ka bands. 8 antennas	5300 kg / 19 kW
SES-14	2 payloads: High Throughput Satellite mission with a Digital Transparent Processor and a C and Ku-band payload. 7 antennas.	4200 kg / 16 kW

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Quantum: flexible payloads, faster and cheaper design

- **First fully reconfigurable payload:**
  - **Modular and scalable payload**: coverage, bandwidth, power and frequency flexibility.
  - **More agility**: changes during satellite manufacturing or after launch.

- **Co-innovation**
  - **PPP contract** with Eutelsat and European Space Agency.
  - **New payload technology** developed under the ESA ARTES programme and supported by the UK Space Agency.
  - **New small geo satellite platform** (up to 7 kW / 450 kg payloads).

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The factory of the future? A new way of building satellites?

1965 – 2015 : from A1 to 1W…

- Driven by costs, large volume production (techniques inspired by Aircraft manufacturing).
- Full series production: dedicated plant located in the US
- Design and production of the first 10 satellites: Airbus Defence and Space's facilities in Toulouse.
- Impact on legacy products and future programmes.

A challenge and an opportunity:

- **New manufacturing process**
- **Factory of the future**

What can we expect for the next ten years?

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Future disruptions? Why not this one?

A persistent Earth observation system from GEO:
14 hours per day of optical imagery, video capability, moving target detection, fast response time, real time observation.

New cooperation schemes in Europe: a long way…

- **Space, still a strong symbol for nations.**
- **Working together: a challenge…**
  Cooperation: lengthy but robust process
- **New space: new roles of states and agencies?**
- **US: from space dominance to information dominance?**
- **Example in Europe: Copernicus governance**
  - The right balance between national and shared/collective assets? Shared ownership and concept of operation.
  - Various management procedures at national levels.
  - Different (but co-existing) technical approaches with impact on governance and usage policies (e.g. data policy for earth observation).
  - Coherence between complexity of the decision-making and private investment rules ROI, IRR).
  - Earth Observation satellites: the challenge of customer demand aggregation from a fragmented and heterogeneous users' base.

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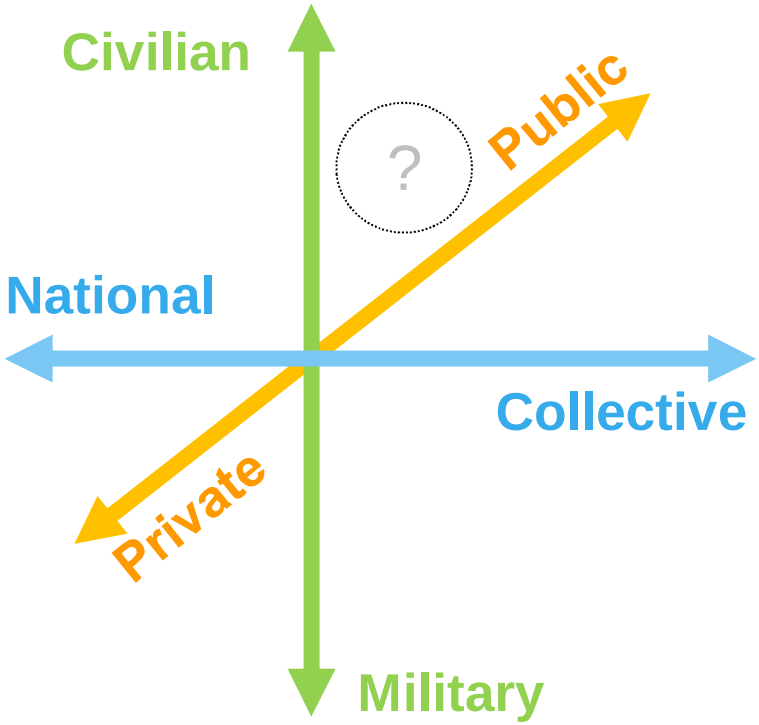
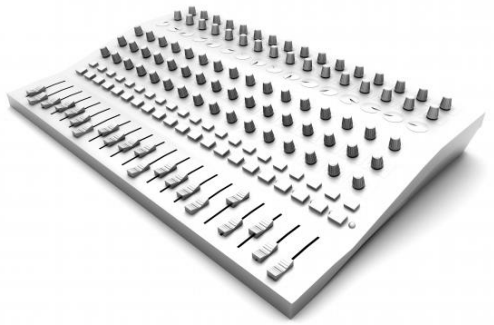
Game of Thrones: and the winner is…

- **New dimensions of dual use:**
  - Public / Private.
  - Civilian / Military.
  - National sovereignty / Multinational organizations
- **Fast evolution of technology and new business models…**
- **… but many obstacles at governance level:**
  - Hamper innovation in collective solutions.
  - Slow decision-making: a threat for large public initiatives.
  - Budget constraints can become an opportunity.
  - Often black or white options (e.g. data policy). Nuances of grey are more complex but often more sustainable.





Choose your winner and don't forget New Earth…

Questions?

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