

Veolia Institute and Oxford Martin School 2017
Oxford, 3 November 2017

*The reach of the Circular Economy –
closed loops, low-carbon low-waste
business models*

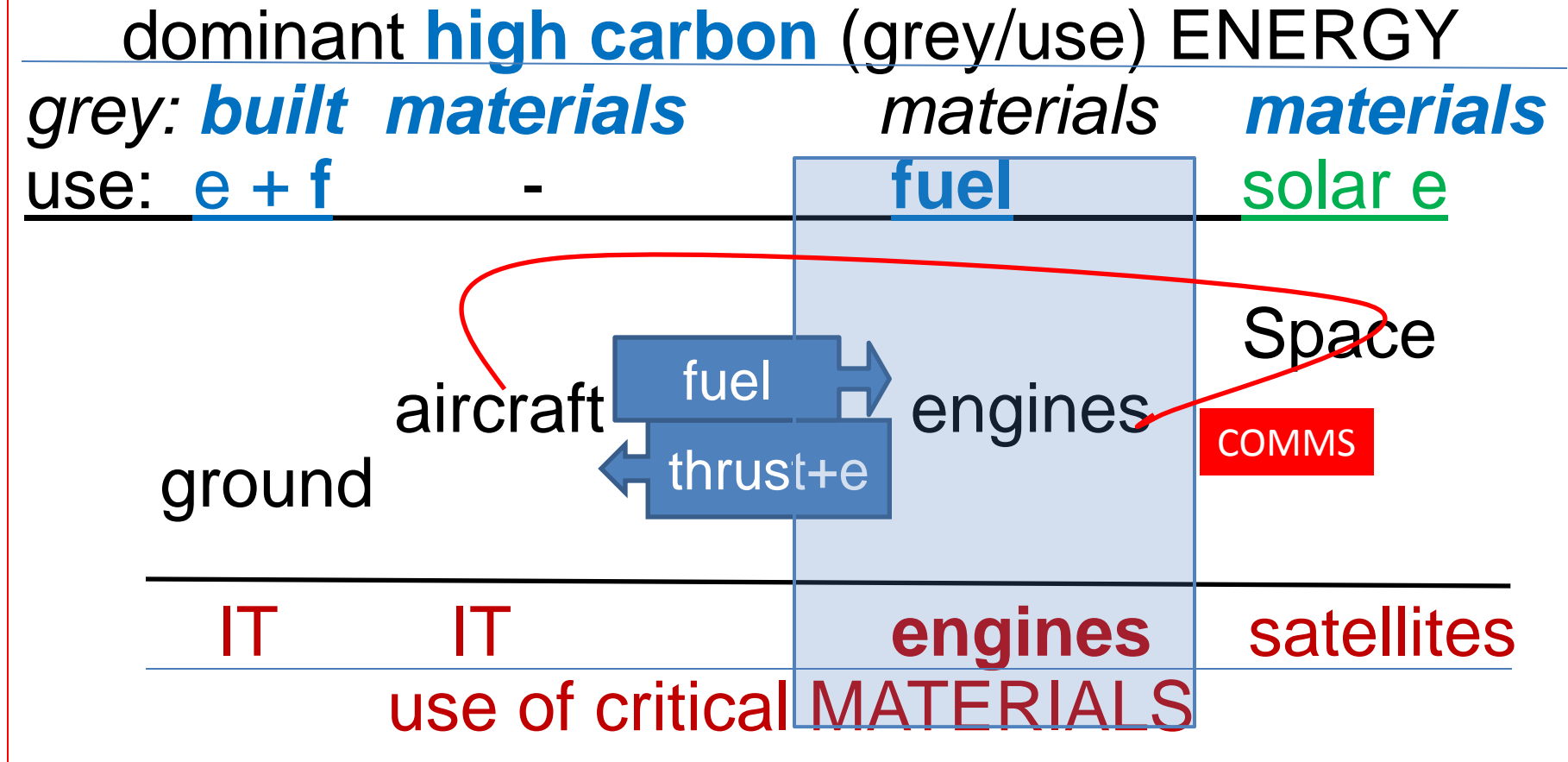
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Aircraft engines in a systems context

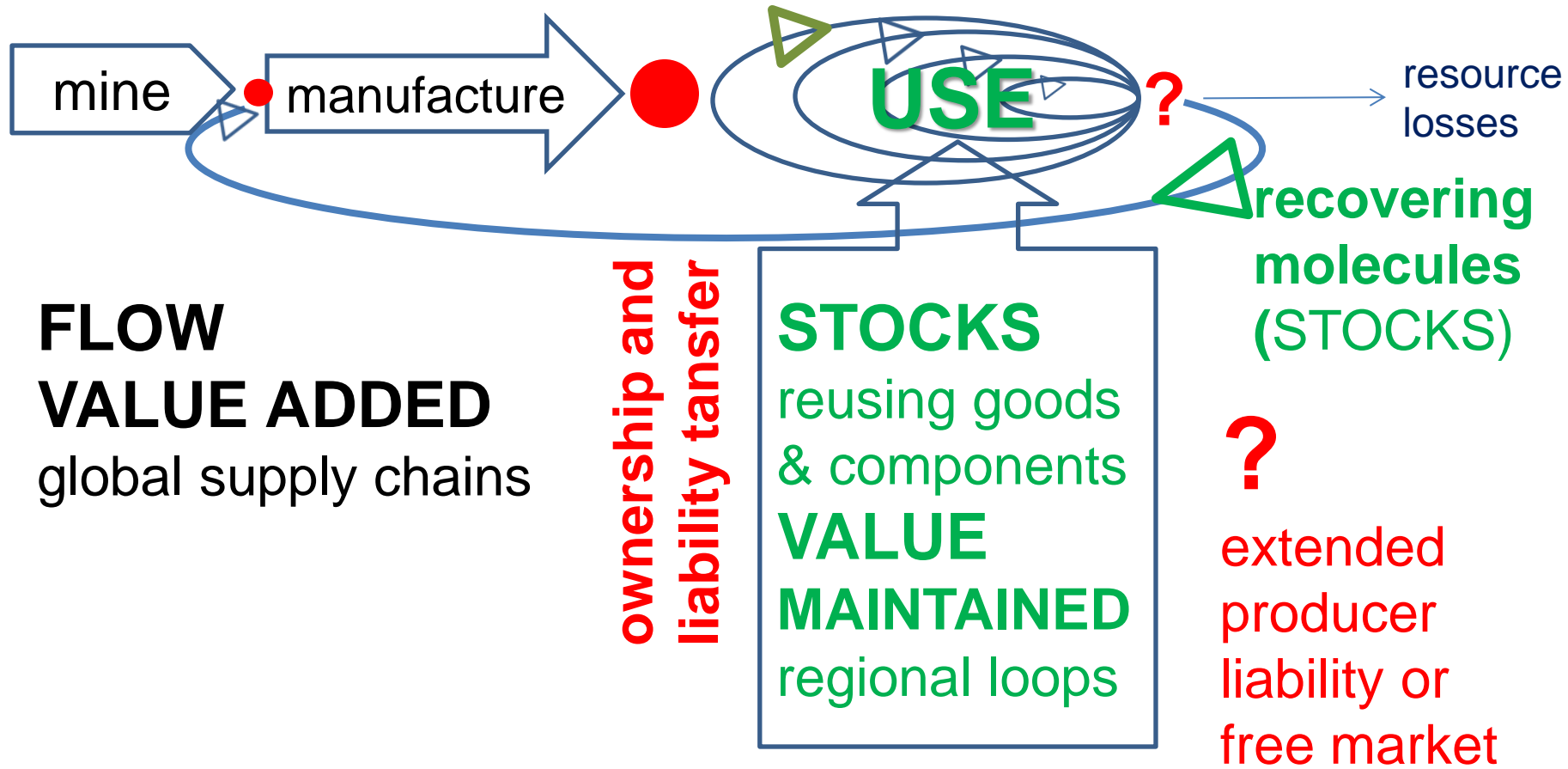


e = electricity, f = fuel

Two economies, separated by the PoS ●

Linear Industrial Economy
producer controlled flow **PoS**

Circular Economy
owner controlled stock



Physics and economics in two loops

preserving stocks vs managing waste

reusing products:

- maintains most embodied resources,
- **prevents** waste,
- has **price (quality) advantage** over new
- manages stocks,
- is labour intensive,
- trend to regional and local SMEs,
- owners rule.

Second law of thermodynamics

material recycling:

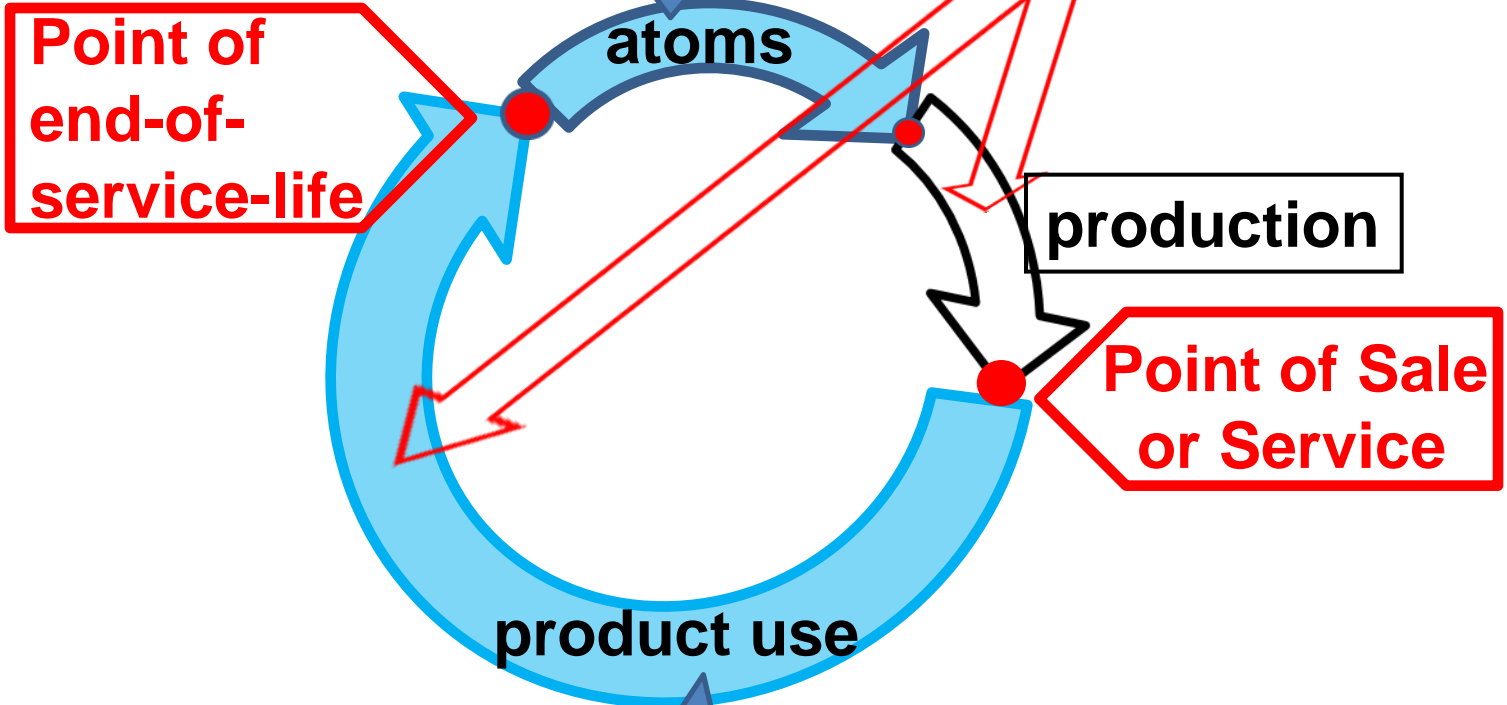
- loses most embodied resources (CO₂, H₂O),
- reduces waste volume
- has fixed-cost and purity disadvantages,
- manages flows,
- is capital intensive,
- trend to globalisation & economy of scale,
- China rules.

backcasting view from a mature CE

from end-of-life to **as-pure-as-new** resources (atoms)

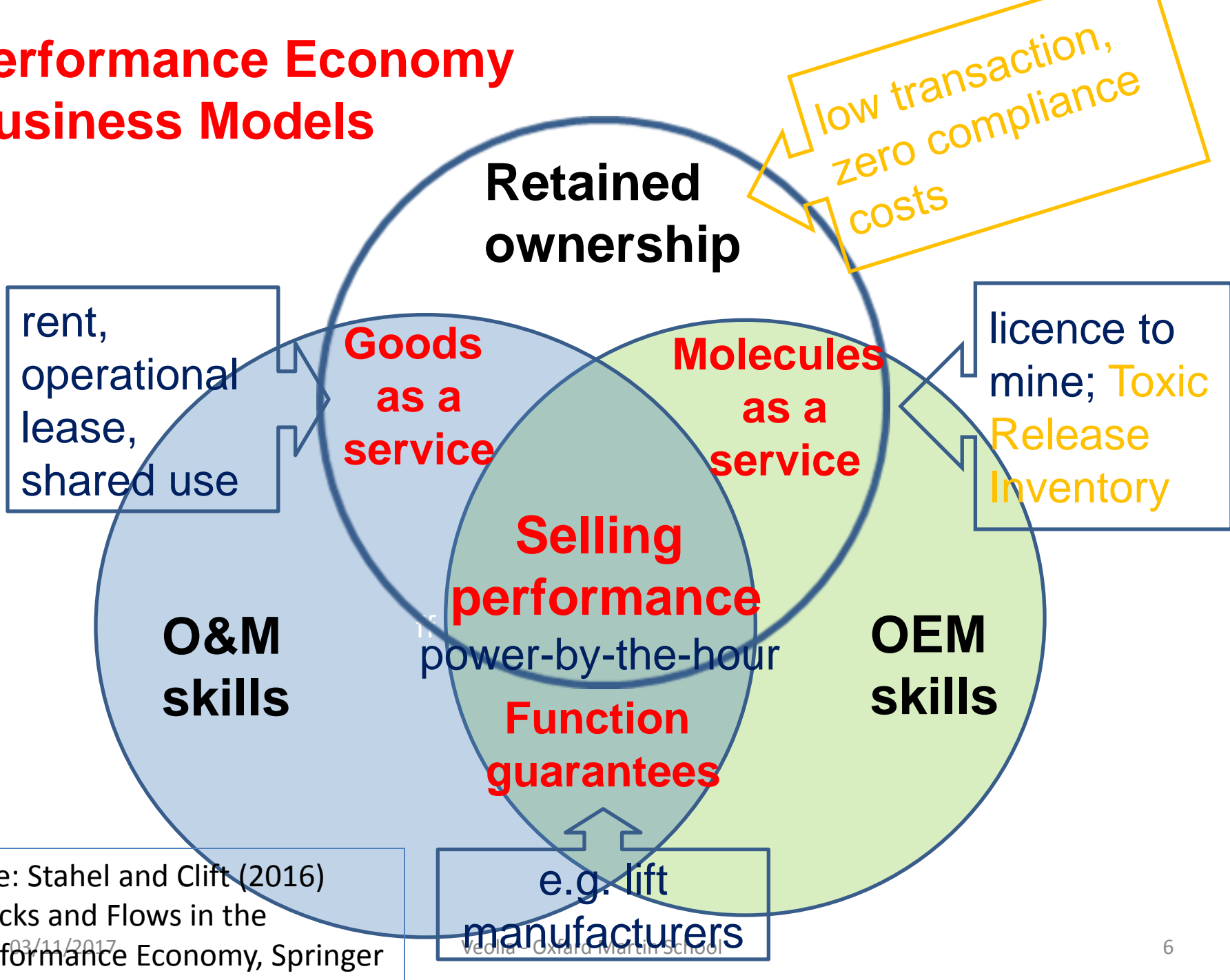
the era of 'D'

innovative new materials, components



the circular user economy **maintaining value & utility**
quality & quantity of stock

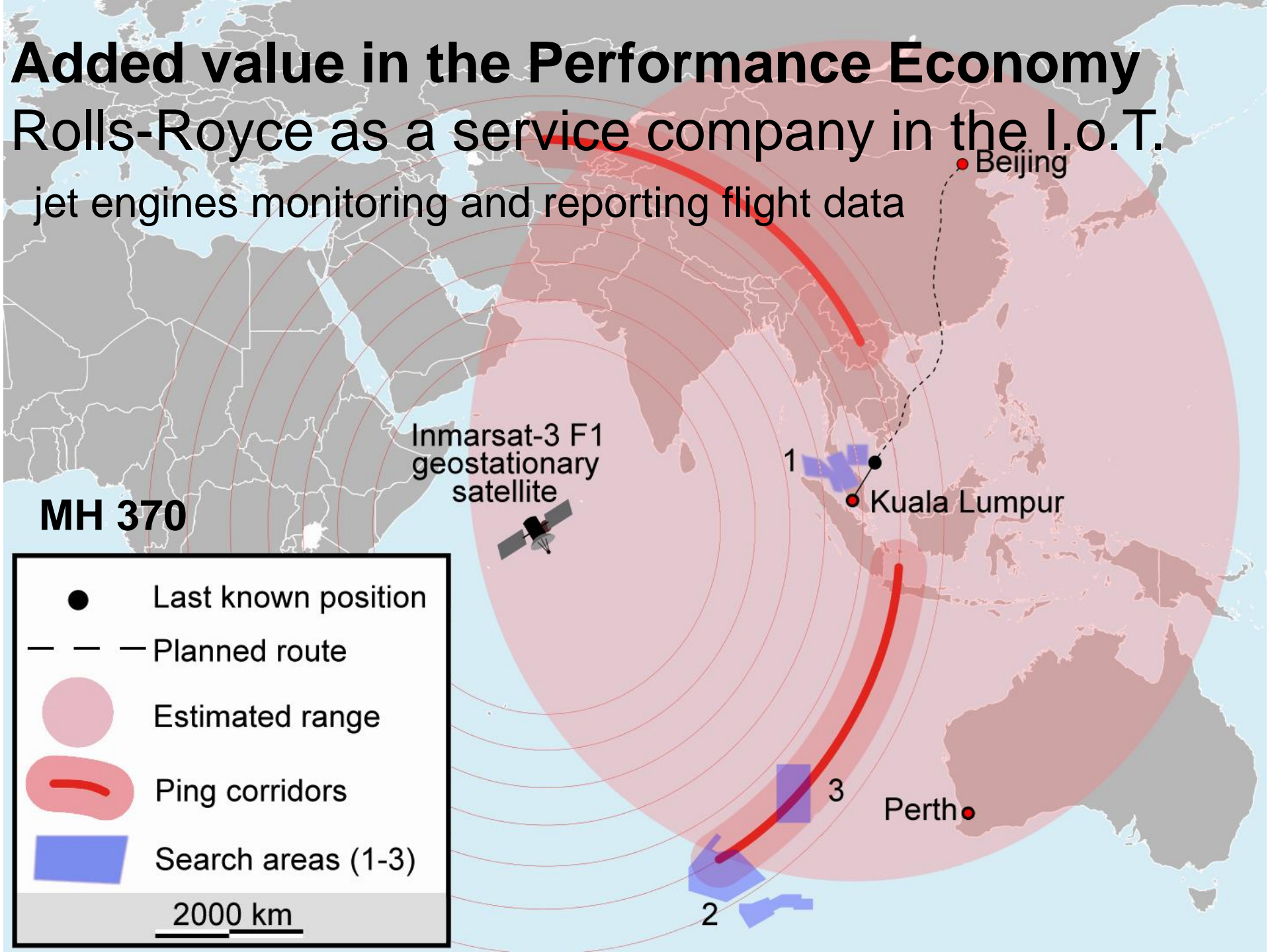
Performance Economy Business Models



Added value in the Performance Economy

Rolls-Royce as a service company in the I.o.T.

jet engines monitoring and reporting flight data



MH 370

Inmarsat-3 F1
geostationary
satellite

Beijing

1

Kuala Lumpur

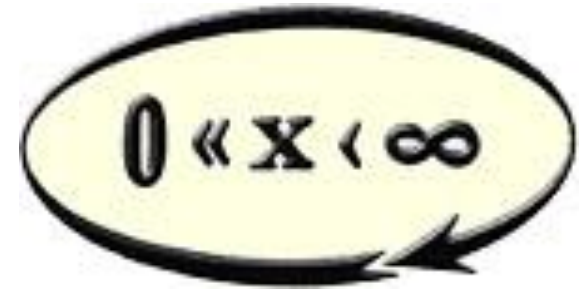
3

Perth

2

- Last known position
- - - Planned route
- Estimated range
- Ping corridors
- Search areas (1-3)

2000 km



Thank you for listening

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