

Managing Collaborative Innovation Projects in the Space Industry





Artist's view of three Tracking and Data Relay Satellites (TDRS), the ISS and Hubble Space Telescope orbiting Earth. – Credits: NASA/Goddard Space Flight Center.

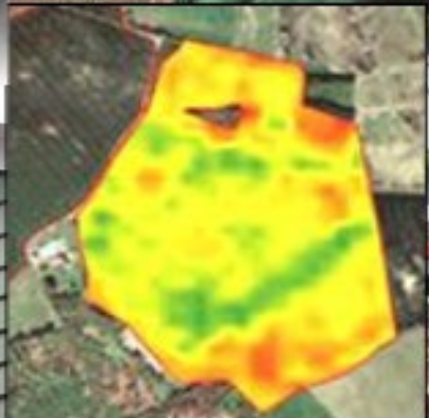
Communications



Timing



Agriculture



Disasters

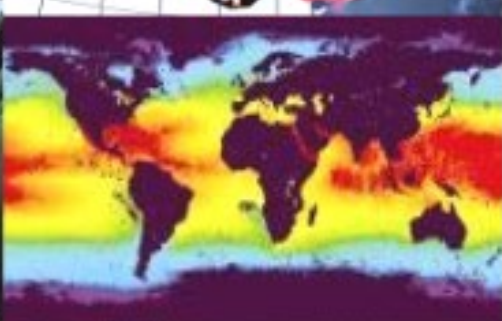
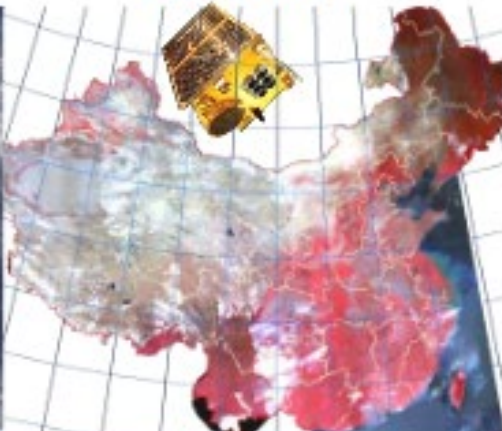


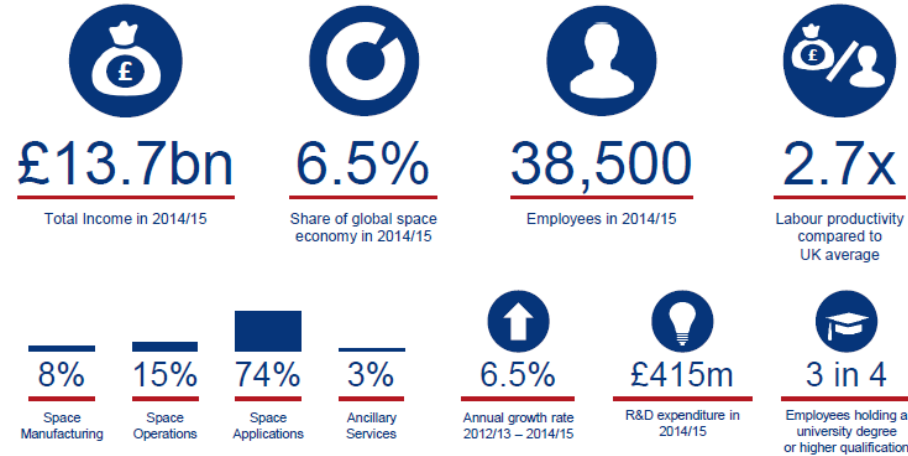
Exhibit 1: Space Age 2.0 in a nutshell



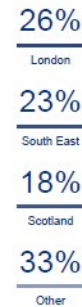
Source: BofAML Global Research based on various sources



Size & Health of the UK Space Industry 2016



Regional employment



Wider UK GDP* supported by satellite services



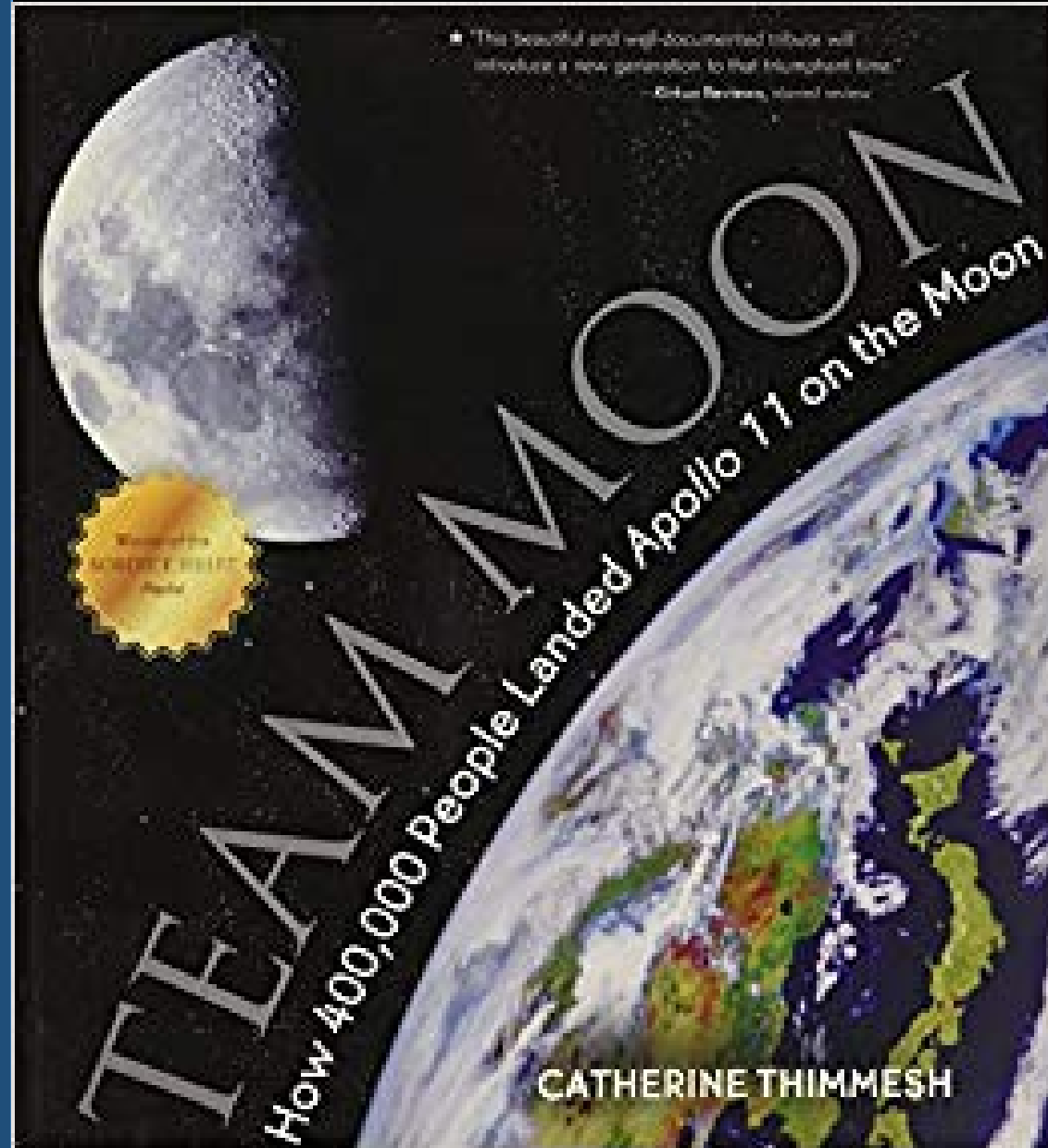
**How many people
did it take to land
Apollo 11 on the
Moon?**



Team Moon: 400,000 people

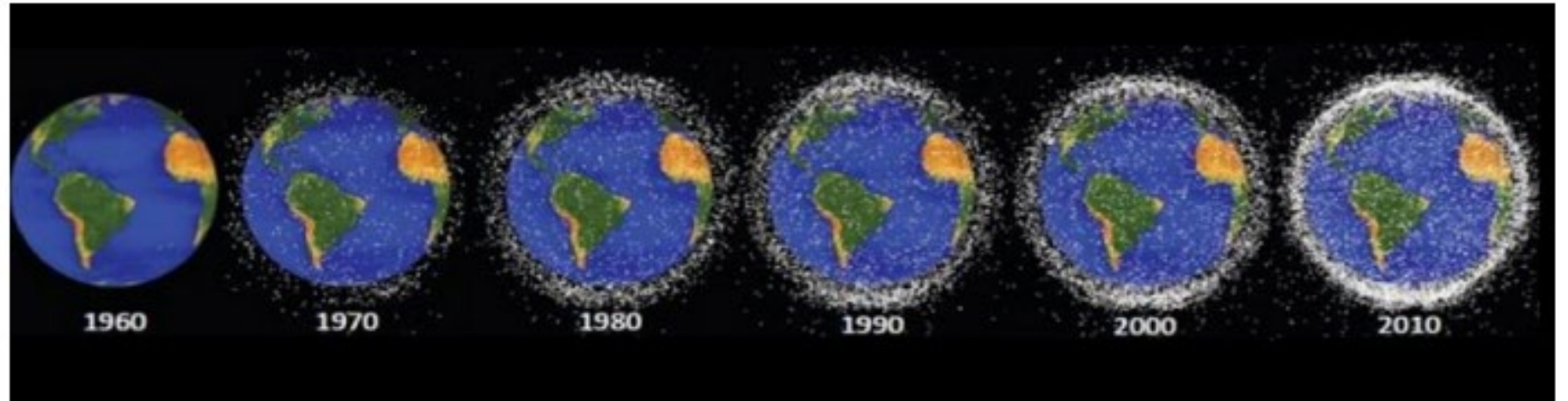
Seamstress
Flight directors,
Camera designers,
Software experts,
Suit testers,
Telescope crew,
Aerospace technicians,
Photo developers,
Scientists,
Engineers,
Navigators,

and thousand of other roles

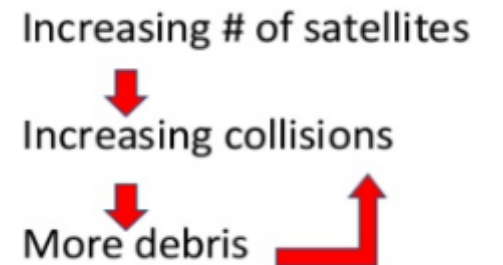


Complex challenges:

- Space Debris



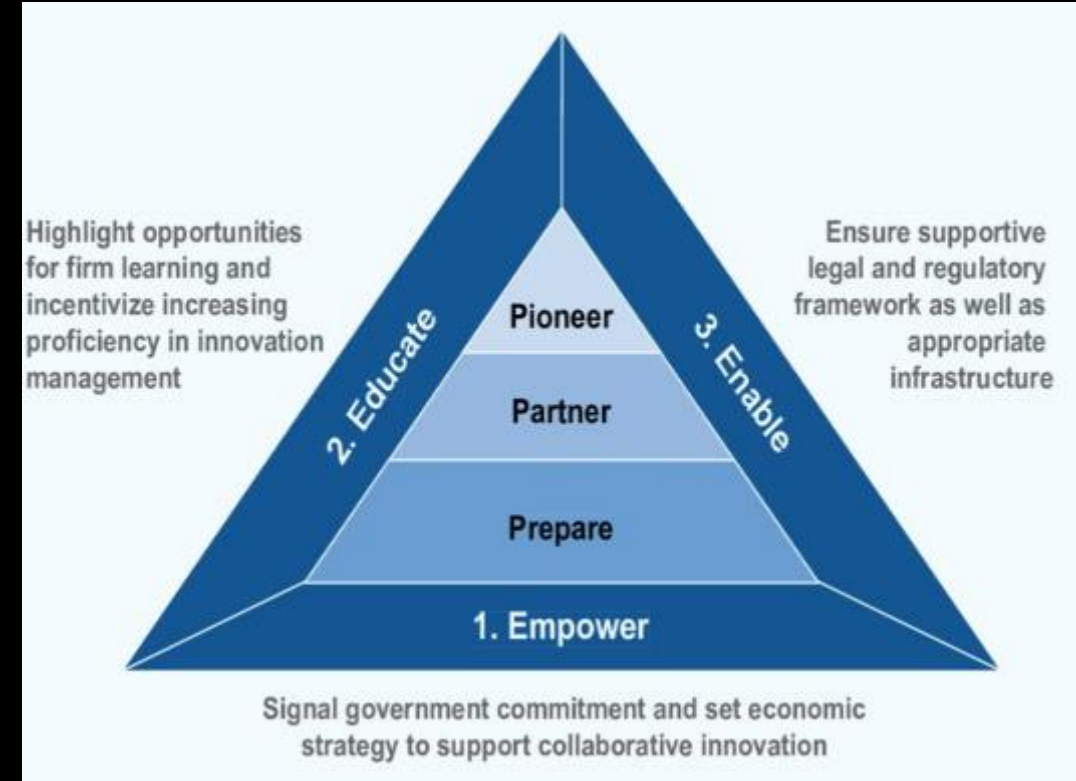
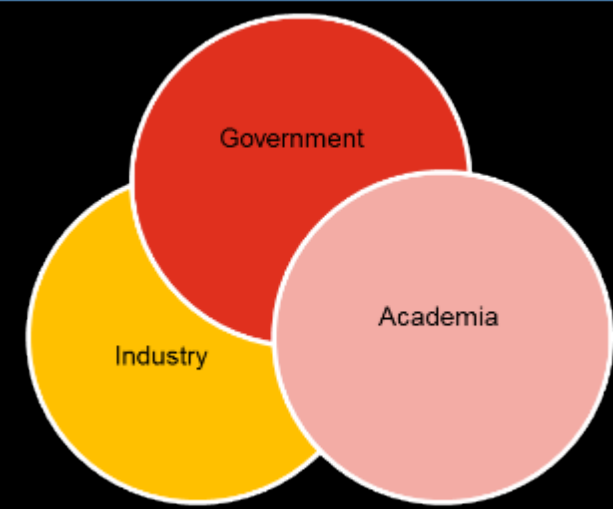
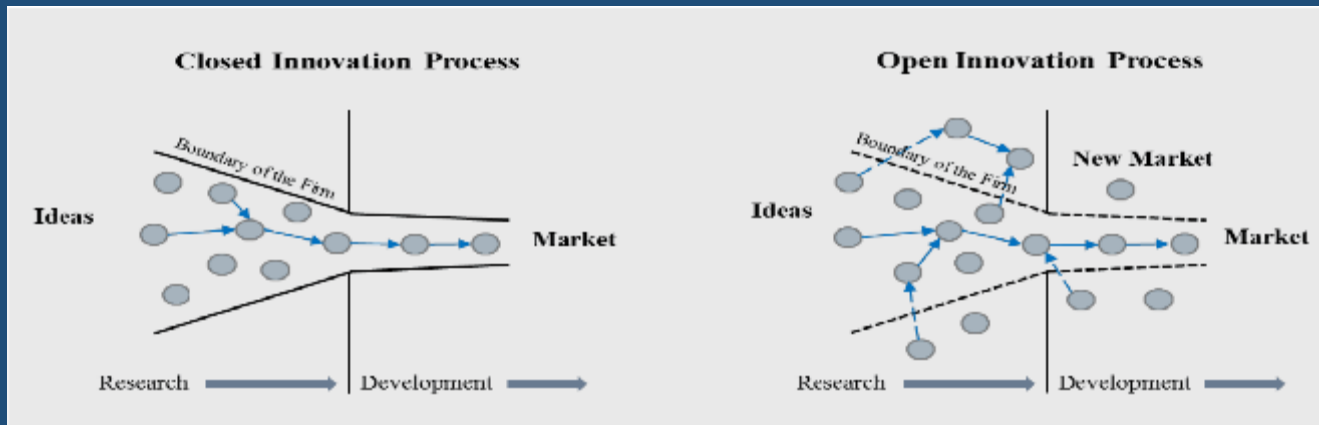
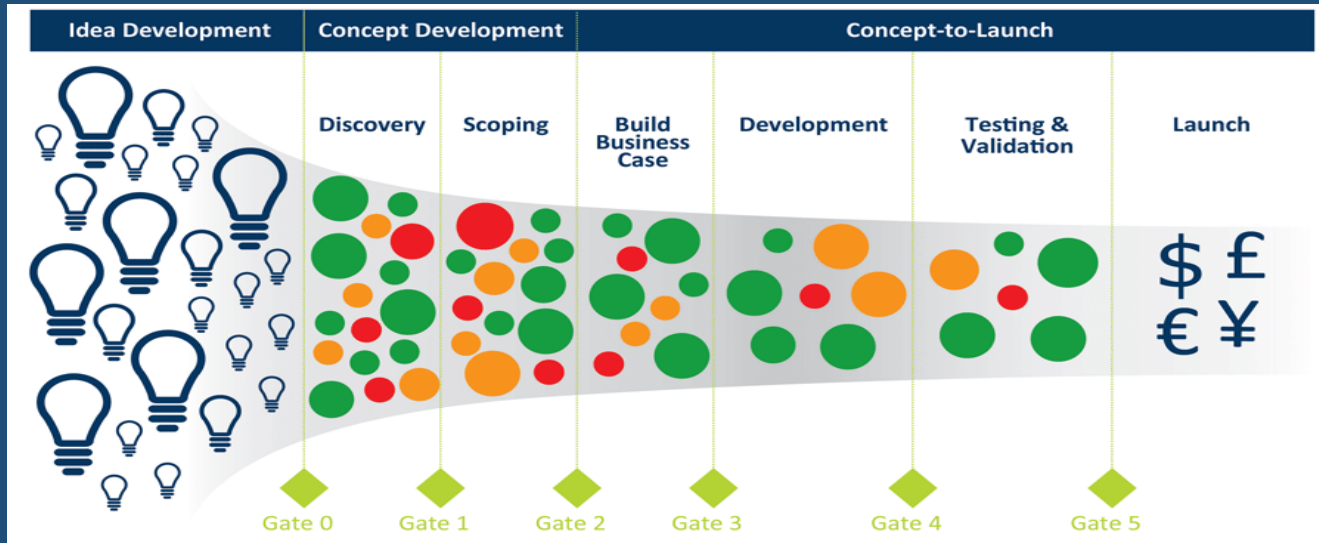
- 17852 detectable artificial objects in orbit, 1419 operational
- 170 000 000 (< 1 cm), 670 000 (1-10 cm), 29 000 (> 10 cm)
- → Hazard to operational spacecraft



Solution: Collaborative Open Innovation

- **T**he strategic partnership specifically between a young, entrepreneurial firms, and established firms, such as a multinational corporation.
-
- Combines the strengths of these firms – at uniquely different stages of business – to discover and commercialize new technologies, products, and services efficiently.
- At its best, collaborative innovation promotes long-term economic growth and regional competitiveness

Solution: Collaborative Open Innovation



Source:
https://www.researchgate.net/publication/280716899_Collaborative_Innovation_Transforming_Business_Driving_Growth

General project objective

- To demonstrate key technologies for Active Debris Removal (ADR):
 1. Capture technology → net and harpoon
 2. De-orbiting technology → drag augmentation
 3. Proximity Rendezvous operations technologies
- Technology **demonstrations carried in orbit** using a micro satellite (100 kg) test-bed



Consortium

-  University of Surrey
-  Surrey Satellite Technology Limited
-  Airbus Defence & Space
-  Astrium SAS
-  Ariane Group
-  Astrium Limited
-  ISIS Innovative Solutions In Space BV
-  CSEM
-  INRIA
-  Stellenbosch University

Project status

- Started en 2013
- Launched on SpaceX
2 April 2018
- Docked to ISS 4 April 2018
- Commissioning on ISS
(JEM Airlock Depress)
- **Deployment 20 June**
from Japanese module
- Mission end 1Q 2019

Project Challenges



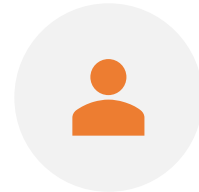
Limited
funding



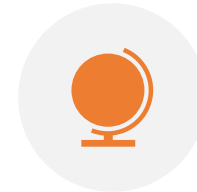
Tight
schedule /
timing



Technical risk



Complex
team
organisation



Management
by
consortium



Strict
regulatory
framework

Challenges of Collaborative Virtual Projects

No common goals / visions for project

Lack of effective leadership

Varying Policies / Procedures / Processes

Misunderstandings of various corporate cultures

Lack on understanding of roles / responsibilities

Lack of effective and efficient communicating channels

Lack of collaboration tools and technologies



Defining the Charter



Define the mission with the sponsor



Understand the project history and sensitivities



Establish initial project team contact



Determine the assessment approach



Complete the charter and obtain approval

Developing the Assessment



Is realistic and can be executed to achieve the charter's objectives



Will allow for an assessment in as short a time as possible



Will ensure that accurate findings are produced



Will minimize project team distraction

Conduct the Assessment



Determining the true
current status of the
project



Identifying the major
threats, opportunities and
problems for the project
moving forward



Establishing an extended
team for the recovery
effort

Developing the Recovery Plan



Is of shorter duration and it must not fail.

Typically 2 months



The project will be subject to extraordinary scrutiny, tighter monitoring and controlling.



Provides for broad fundamental changes in scope, schedule and cost.



The project requires greater frequency of communicating and reporting.

Conducting the Recovery



Beginning with
end in mind: a
project no
longer in
recovery



You have: A
well defined
project
controls and
management
system



Conduct the
Project
execution and
monitoring : at
inch-stone
rather than
milestone
level



Monitor :
earned value,
defects,
problems,
risks, etc



Must do:
Regular
acknowledgement
of progress to
build morale.



Develop strategy for collaborative innovation : identify key suppliers and partners



Conduct collaborative business planning : involve all stakeholders



Build trusted relationship : Open and honest communication with partners



Get your own house in order : resourcing, finance, and management buy-in

Project Lessons Learnt



Understanding the business case for each partner.



Networks are the best avenues to finding the right partner.



Partnership structures should be flexible to react to a wide range of scenarios

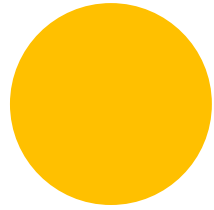
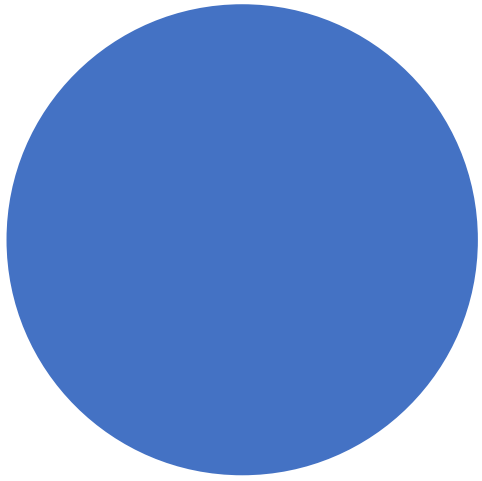


Intellectual property agreements need to be mutually beneficial.



Employees need to be prepped for collaboration.

Before starting collaborative innovation projects:



Thank you



