Small Satellites

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Surrey Satellite Technology Limited

SSTL – The Company

- UK satellite manufacturer is owned by 99% Airbus Defence & Space 1% University of Surrey
- Since 1985, employing ~580 staff
- Facilities in Surrey, Kent, Hampshire & Colorado


Cubesat
s
SSTL-X50
SSTL
100
SSTL
150
SSTL 300
SSTL 300 S1
SSTL NovaSAR

SURREY SATELLITE TECHNOLOGY LTD

Changing the Economics of Space

31+
Years+ in operation.
6 Oct 1981 to date.

40%
Share of global small satellite market.

2
Spacecraft launched per year

26
Launches from 8 launch sites

3.5kg
Lightest SSTL spacecraft (STRaND-1)

660kg
Heaviest SSTL spacecraft (GIOVE-A)

15
Number of satellites currently operated or monitored from our Mission Control Centre

480.9
SSTL satellite years in orbit

30
Longest duration SSTL satellite operating in orbit (years)

43
SSTL satellites launched

5
Number of SSTL constellations deployed and under contract (DMC, RapidEye, F7, DMC3, Kanopus)

6
Space Agencies formed

18
SSTL space development and training programmes

3
Spin-out companies

21
Satellites in manufacture

24
Payloads in manufacture

As at July 2014

battery as the internal resistance of the cells increased with old age. Fig 2 shows the battery temperature during the same period (Note that the higher the telemetry count, the lower the temperature). The excessive battery temperature accelerated the deterioration of the battery as cell after cell failed (short circuit), and the bus voltage

The origins of the small sat revolution can be found in a desire to make space accessible to all.

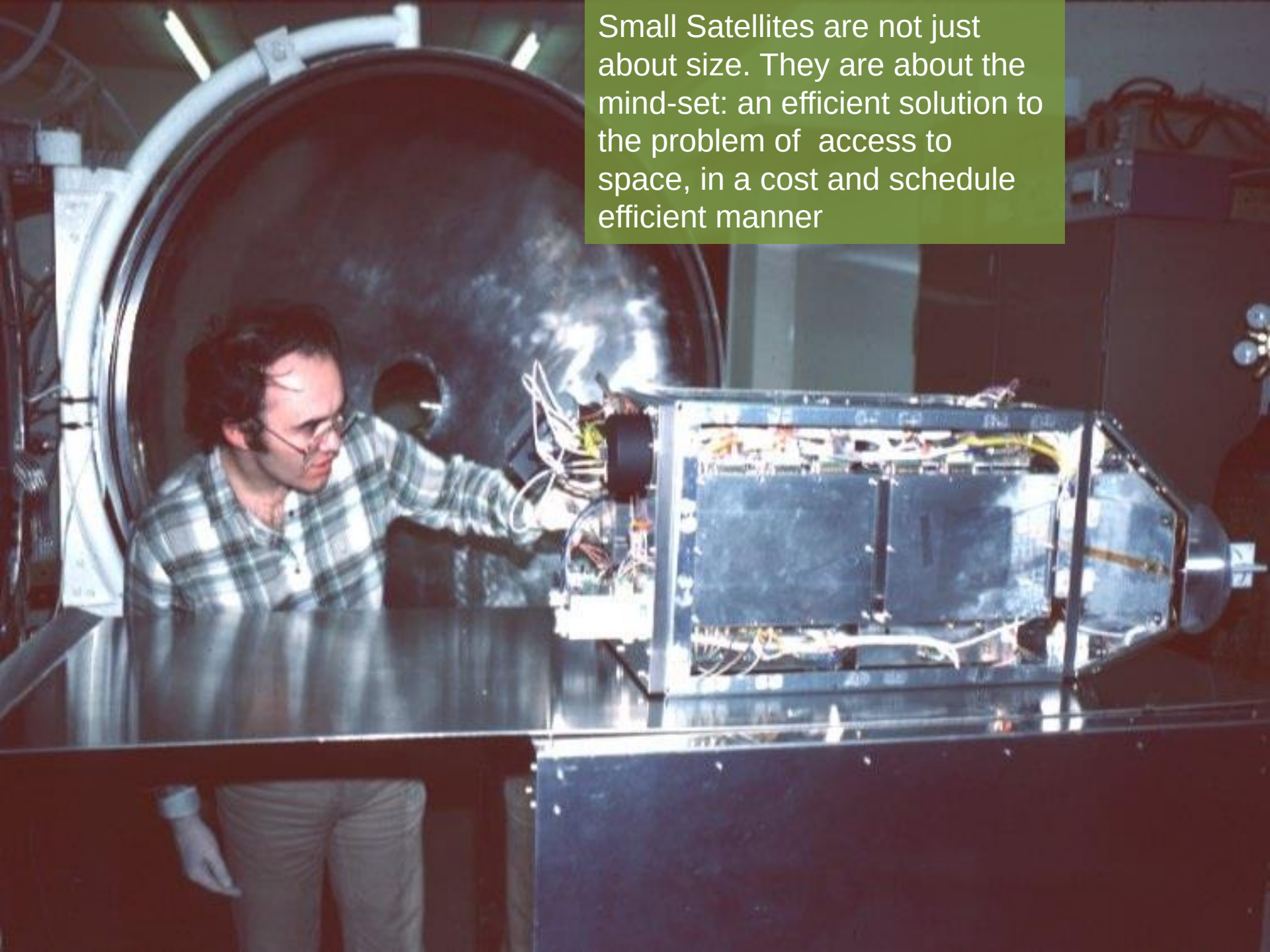
Radio Amateurs were among the first to challenge the concept that space required big budgets

of the NOAA-4 and 5 meteorological satellites. Daily cloud-cover pictures were taken until the failure of the NOAA-5 instruments in March 1978. Several spacecraft in the Nimbus and (Russian) Meteor series are also periodically observed.

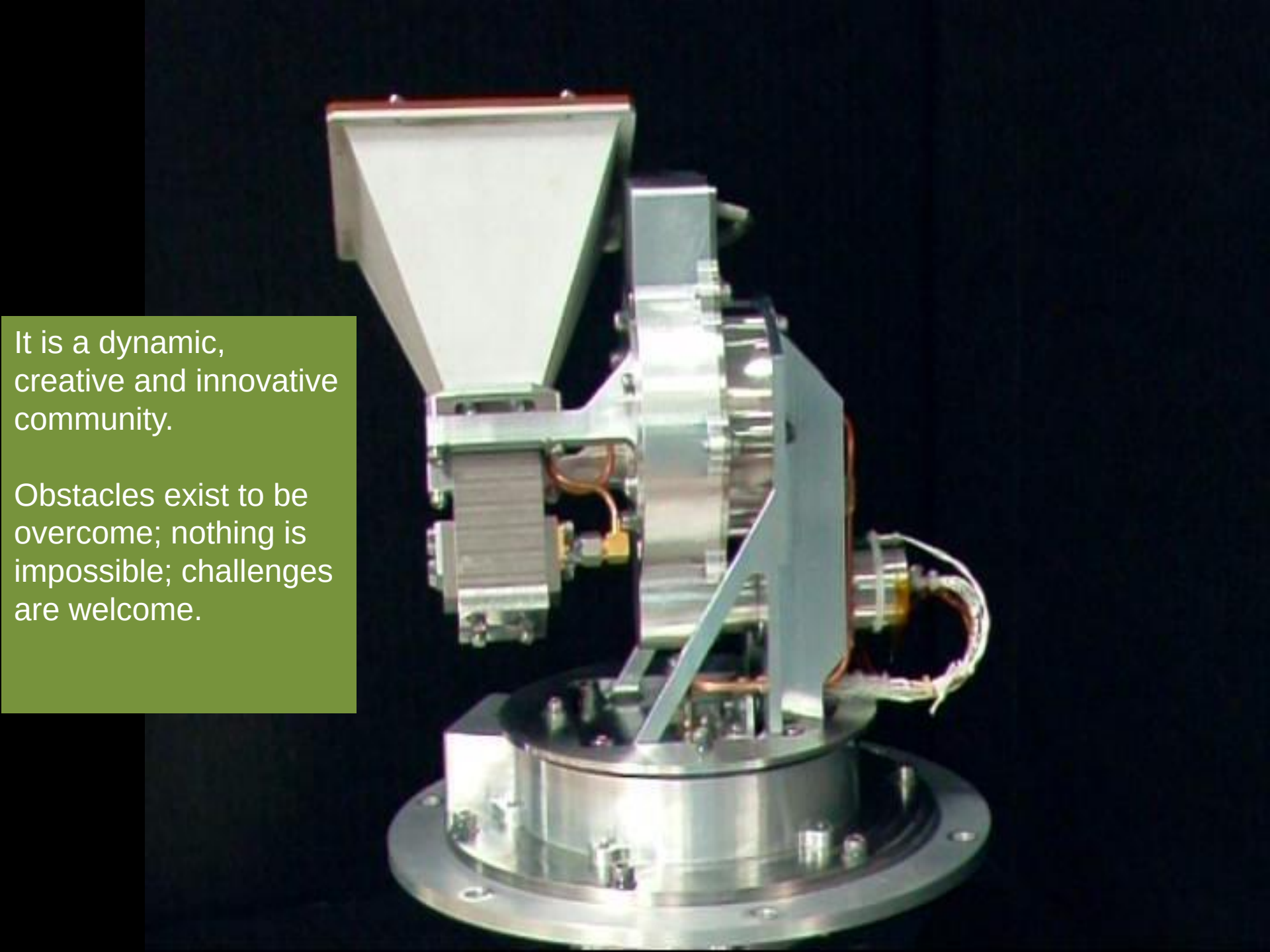
AMSAT Oscar 8

Oscar 8 was launched from the Western Test Range at Lompoc, California, on 5 March at 1754 and was ejected from the second stage of the Thor-Delta launch vehicle at 1919 over Greenland. The 435·1MHz beacon was heard at UoS for a few seconds after ejection and before the spacecraft dropped below the Arctic horizon. On the following orbits, downlink telemetry and doppler

Operators (l to r): G8MLO (Kev), G4EDW (Paul), G3YJO (Martin), G8JFX (Tim) and G4CWH (Colin) on the roof of the university with the antenna mounting in the background. Other operators, not shown, are G8NEF and G8NEH



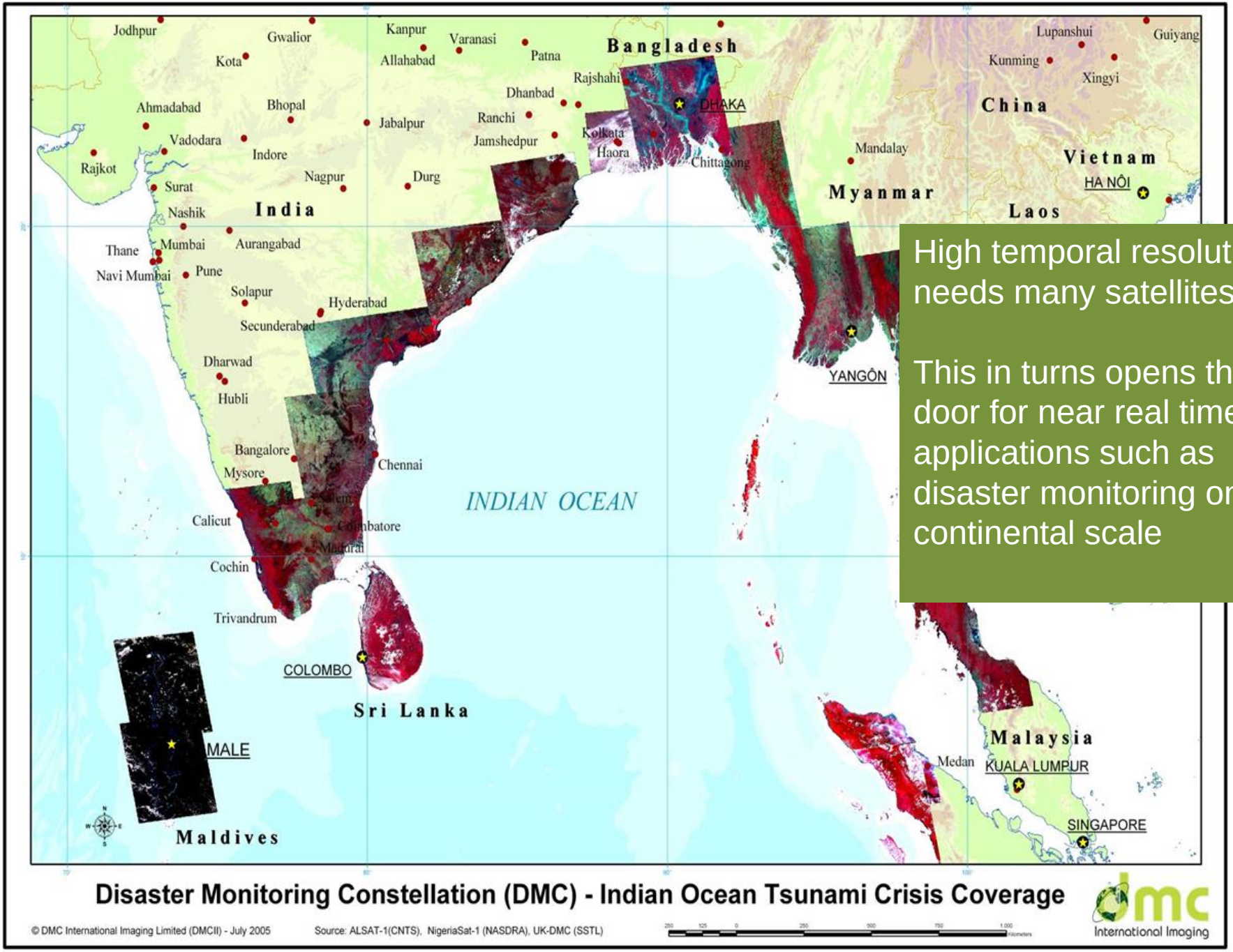
Small Satellites are not just about size. They are about the mind-set: an efficient solution to the problem of access to space, in a cost and schedule efficient manner



It is a dynamic, creative and innovative community.

Obstacles exist to be overcome; nothing is impossible; challenges are welcome.

Small satellites offer developing nations access to a cutting edge technological sector, while making available a much needed developmental aid



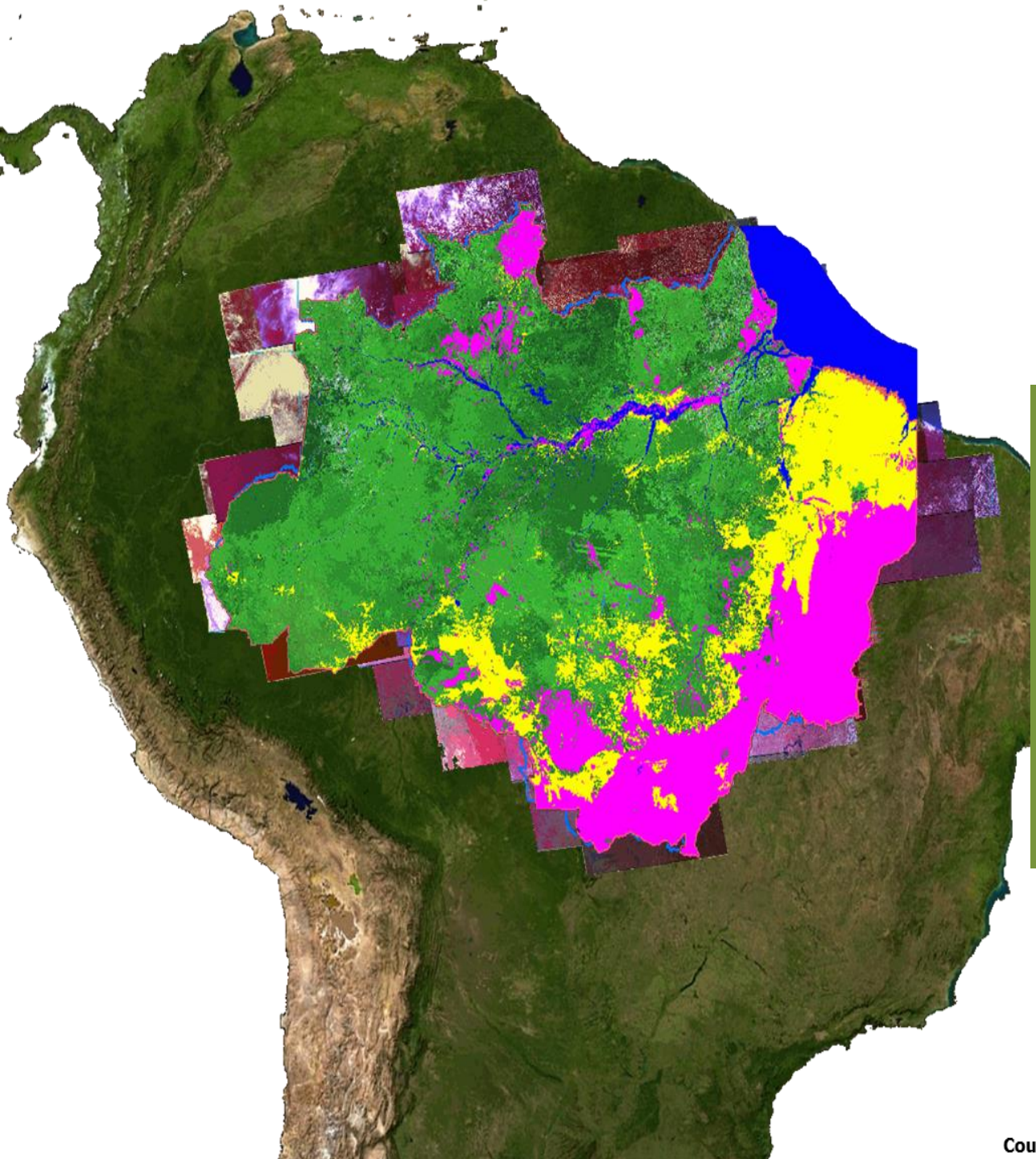
High temporal resolution needs many satellites.

This in turns opens the door for near real time applications such as disaster monitoring on a continental scale

Disaster Monitoring Constellation (DMC) - Indian Ocean Tsunami Crisis Coverage

Source: ALSAT-1(CNTS), NigeriaSat-1 (NASDRA), UK-DMC (SSTL)

dmc International Imaging



Courtesy of INPE

Monitoring of large, environmentally sensitive areas requires frequent visits, high quality data and persistence of service over several years.

The DMC has helped to monitor the loss of rain forest since 2004

Development is accelerating: high resolution constellations of 10s of small satellites and communication constellations of 100s of small satellites are upon us. Super and Hyper constellations will dominate the coming years

From “small” small satellites, to “large” small satellites they all need TT&C and on the case of EO satellites, very fast data downloads (>1Gbps).

Additionally many constellations will have inter-satellite links, radar, etc.

The challenge for all of us is how to ensure that this vibrant part of the space industry can grow and bring benefits to all.

It will be challenging, and on occasions uncomfortable, but it is worthwhile!