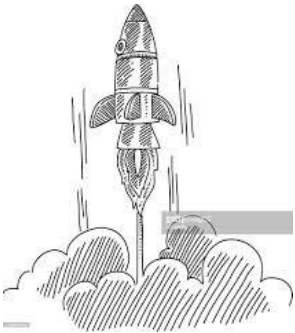




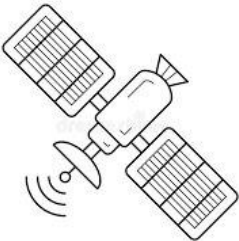
Welcome



 **3rd Edition**
India Space Congress 2024 26th - 28th June 2024
New Delhi



Space Standards: Benchmarking Excellence in Space



Vinod S Chippalkatti
President – SEBU
Centum Electronics Limited



Company Overview



Established
1994



Employees
2200
Design 700



- World Economic Forum: Global Growth Company
- Forbes Asia: 200 Best Under A Billion



Manufacturing area
350,000 SFT
32.500 m²



Public Listed Company
(BSE, NSE)

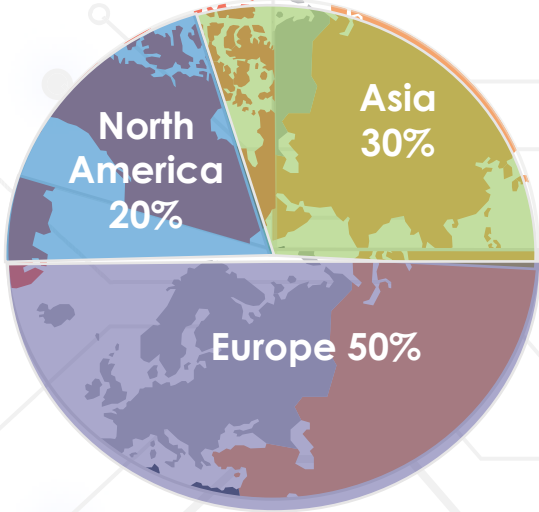


Revenues
\$150M



Product Lab
27000 SFT
2.500 m²

FY2024 Geographical Breakup



Defense, Space & Aerospace



45%

Transport & Automotive



25%

Industrial & Energy



20%

Healthcare



10%

Certifications



ISO 9001



Aerospace
AS/EN9100 Rev D



Medical
ISO13485



Automotive
IATF 16949



Railways
IRIS - Rev 2



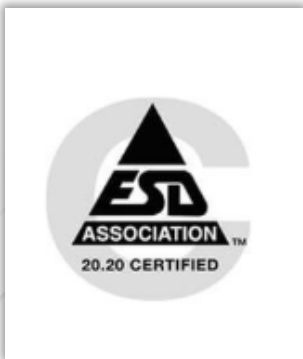
French R&D
certification



Information Security
& Management
system ISO 27001



Environment
ISO14001
Health & Safety
OHSAS 18001



ESD 20:20



Approved R&D
facility by DST &
GOI

*Additional customer-specific certifications required to be qualified as a supplier

23 years of Space Journey



Vertical Integration: Niche Components → Modules → Subsystems → Systems

Domains: Analog → Power → Mixed Mode → Digital / Embedded → RF
Technology: Micro-elecs → Quartz Processing → PCBA/Box-build → MIC/LTCC-Assly

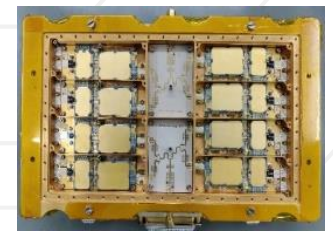
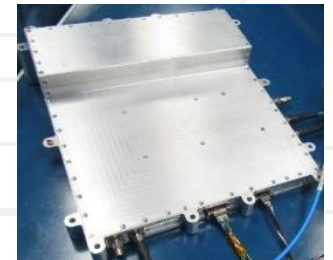
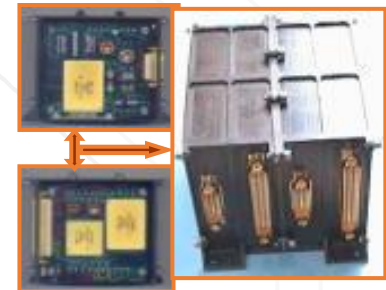
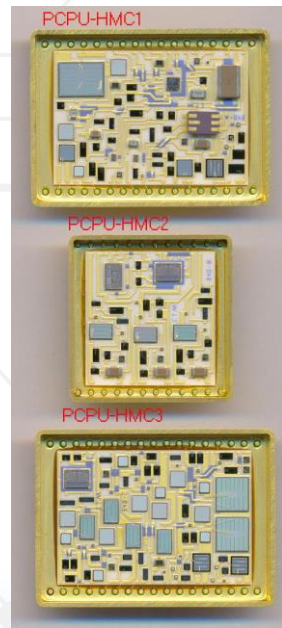
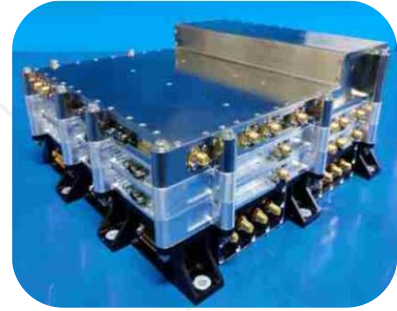
2000-2001 MicroElec Line Qualification to Space standards

2003-2005 Dc-Dc converters, Power Processing Units for Payload Subsystems

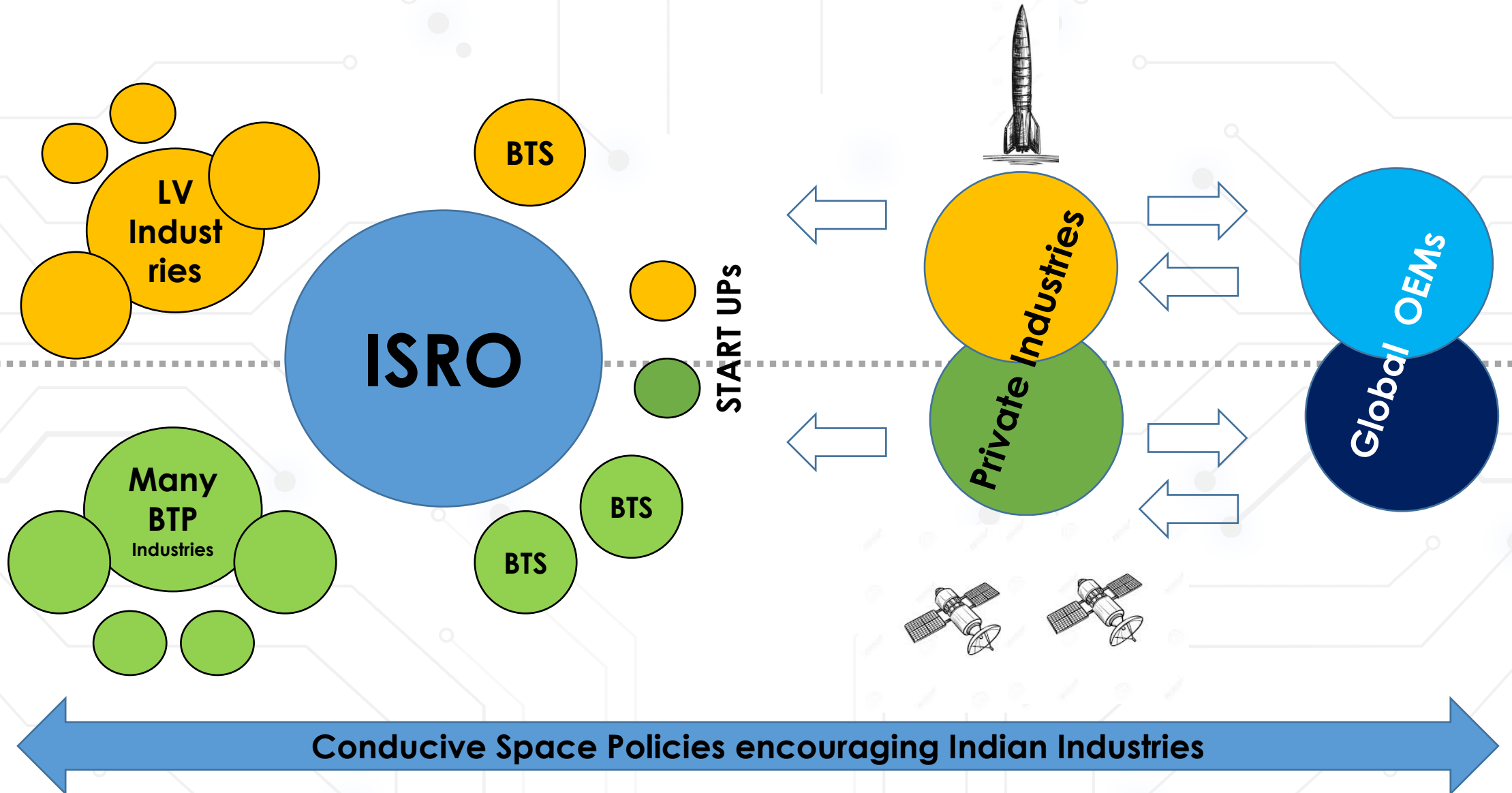
2006-2008 Component Screening, Oscillators for Space, Electro-Optics Sensors (Earth and Sun sensors)

2009-2011 EPCs for RF subsystems, Met Payload Electronics, TCXO, OCXO, Inertial Systems Modules, Subsystems for Launch Vehicles

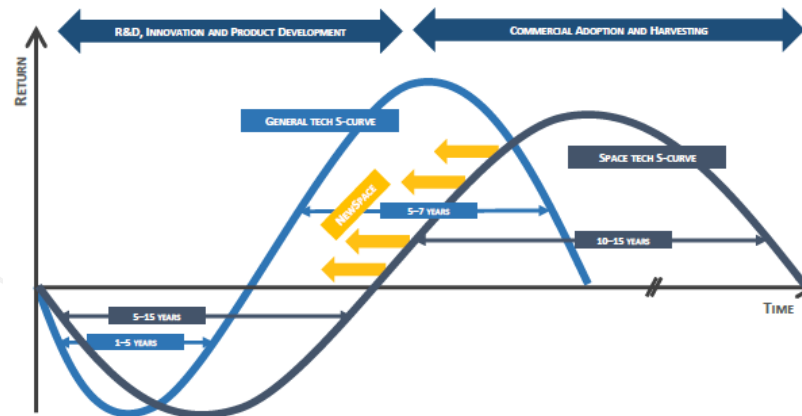
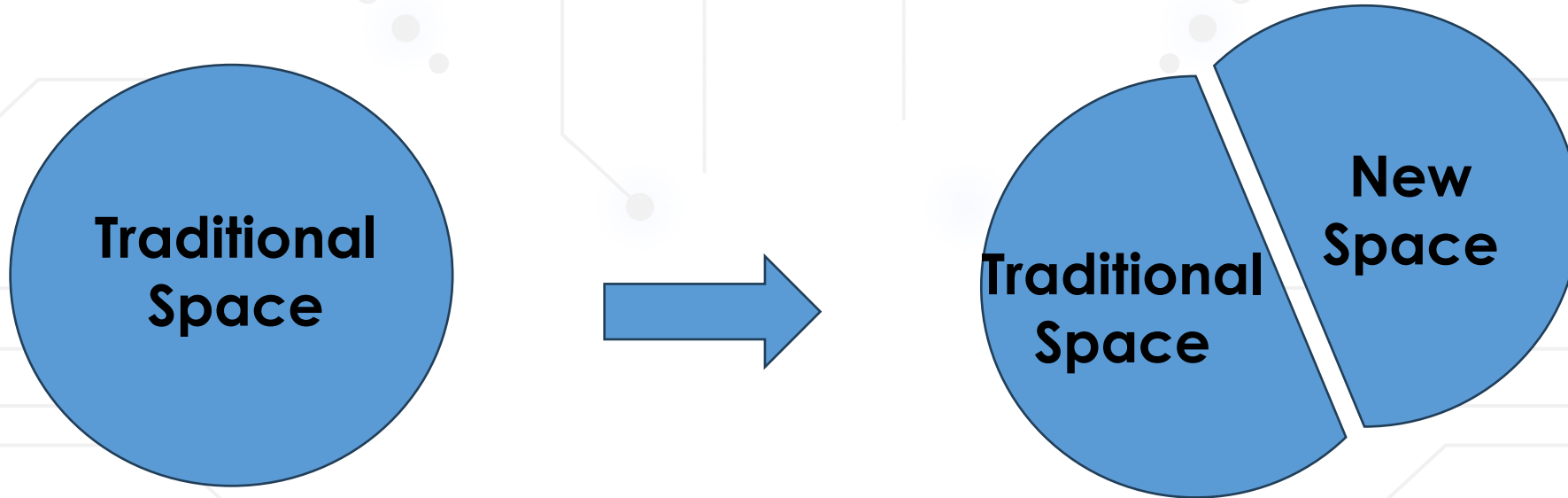
2012-2015 RF Subsystems, MIC Assembly, Digital Subsystems, Small Satellites assembly and testing



Space Industry Eco System



Traditional and NewSpace



Internal Quality Systems

- Culture, Focus, Knowledge, Appreciation for Q etc

Quality Management Systems

- Third Party Certifications like ISO 9001, AS 9001 etc

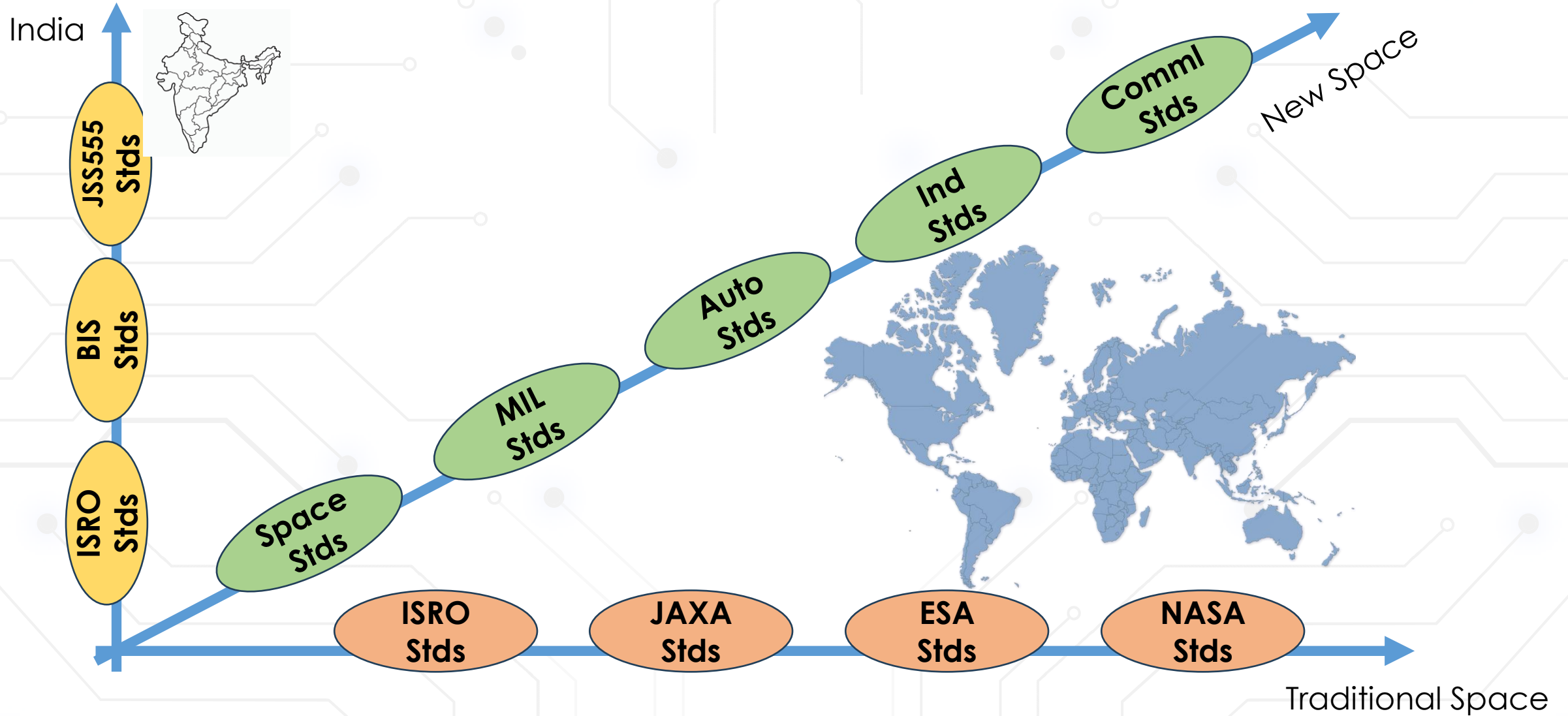
Customer Quality System Accreditation

- ISRO, Thales, Airbus, MDA etc

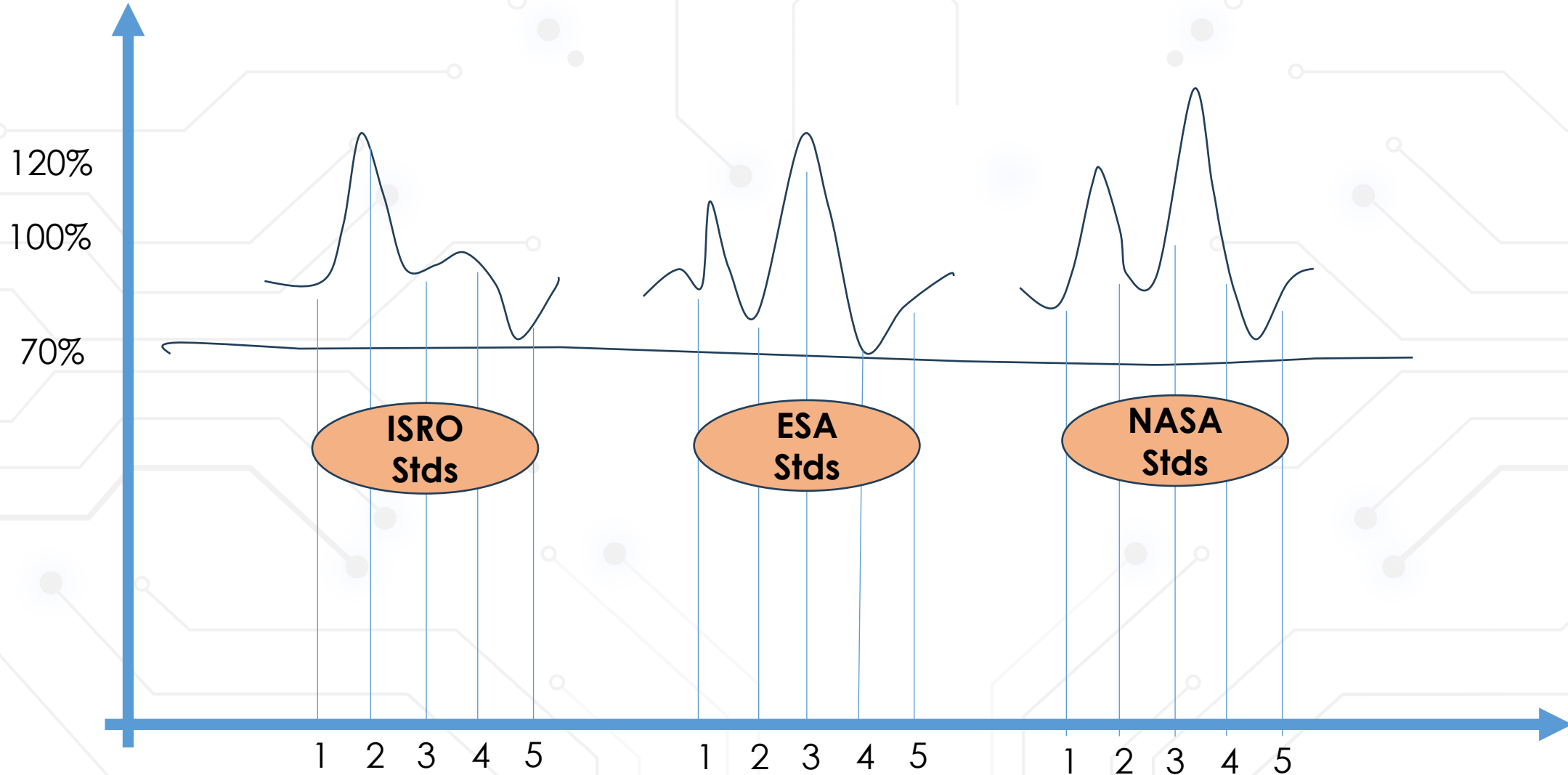
Specific Quality Certification

- Line / Product / Process /Line / Operator Specific

Space Standards: 3-Dimensions



Comparisons of Standards for Traditional Space



- The Bureau of Indian Standards (BIS), in collaboration with the Indian National Space Promotion and Authorization Centre (IN-SPACe), released a compilation of 15 standards that are tailor-made to cater to the unique and demanding requirements of the space industry.
- By adhering to these standards, we are not only ensuring the reliability of our space missions but also strengthening our position in the global space community.
- As we venture beyond the confines of our planet, it becomes increasingly crucial to establish internationally recognized standards that ensure the safety, sustainability, and effectiveness of activities conducted in space.

Cost – Quality : Effect on Standards

STARBOUND

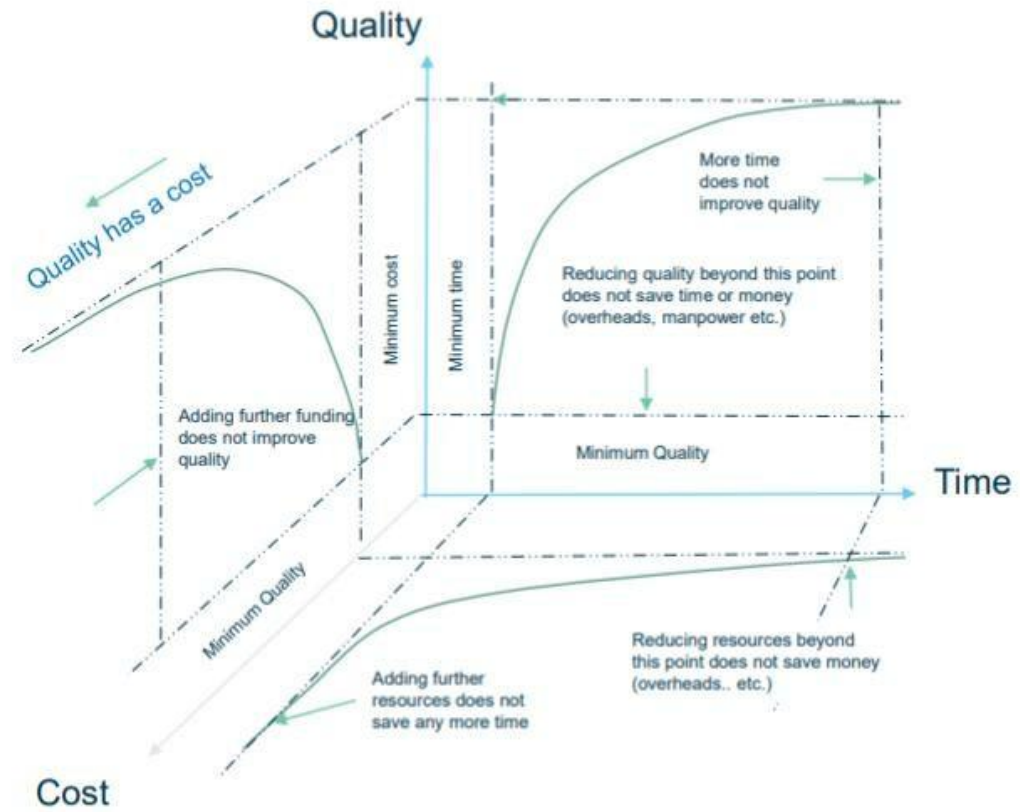
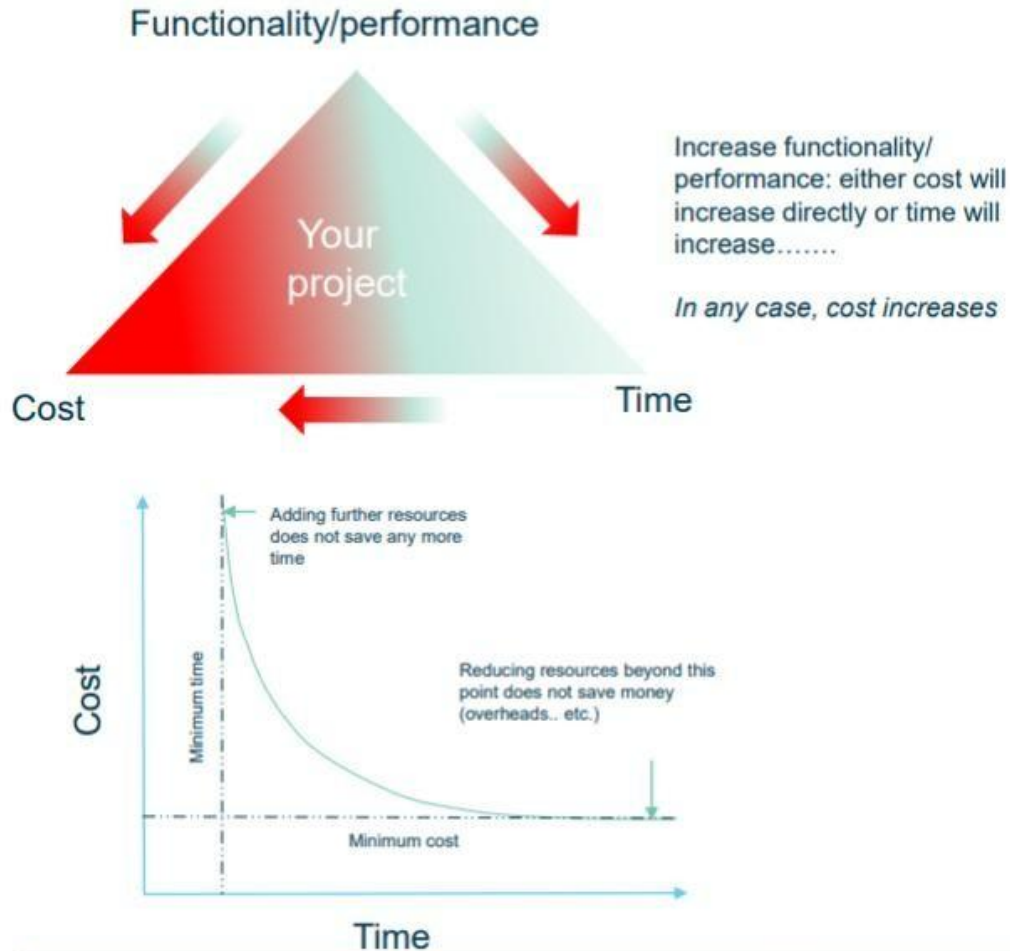
Compliance is a sliding scale. A non-linear one.

Every space product is a **balance of cost and quality**. Striking the balance **takes experience**.

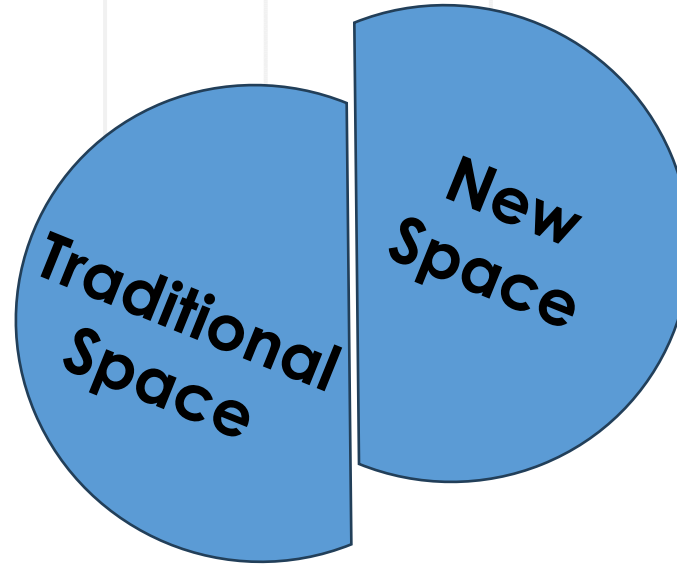


<https://www.linkedin.com/pulse/traditional-space-vs-new-narratives-toxic-theres-room-shaun-kenyon-h0hoc/>

Space Product Assurance Branch [Q-Branch]



- Standardisation
- Established Standards
- 70% Common to all STDs like ESA/NASA/ISRO
- Established global compliance
- Need for regular checks for relevance and need for upgrades



- Customisation focus?
- Established Standards - Absent
- 30% Common and 70% Custom
- No global compliance



A photograph of an astronaut in a red space suit floating in space. The astronaut is wearing a white helmet and is positioned in the lower right quadrant of the frame. The background is a vast, blue, and textured view of Earth from space. The astronaut's suit is a vibrant red, and the helmet is white with a dark visor. The overall scene is set against the deep blue and white patterns of the planet's surface.

Thank You

A lot more can be learnt