



GOVERNMENT OF INDIA , DEPARTMENT OF SPACE
INDIAN SPACE RESEARCH ORGANISATION



Dr. SV Sharma
Deputy Director
& Programme
Director ISAC/ISRO



Main Building



INSAT Building



ISITE

MSA

HDI

AIT-2

SEG

CATF

CATVAC

ATF

SAG

LITF

AIT-1

Vision: Harness space technology for national development

Space Applications

- **Socio Economic Security:** Food, water, Energy, Health, Shelter, Infrastructure & Information
- **Sustainable Development:** Agriculture, Urban, Coastal ecosystem, Climate change...
- **Disaster Risk Reduction**
- **Governance:** Planning , Monitoring & Decision support

Space Infrastructure

- **Earth Observation:** Land, Water, Cartography, Oceanography, Atmosphere & Weather
- **Communication**
- **Navigation**
- **Space Science:** Exploration, Solar Physics, Astronomy, Astrophysics, Space Probes
- **Ground Segment**



Space Transportation

- **Polar Satellite Launch Vehicle (PSLV)**
- **Geosynchronous Satellite Launch Vehicle (GSLV)**
- **Advanced Launch Vehicle**
 - **Modular LV**
 - **Reusable LV**
 - **Human spaceflight**



Capacity Building

- **Human Resources**
- **Technical Infrastructure**
- **Enhanced Output (Outsourcing & TT)**
- **New Technologies Academia, Industries)**
- **Indigenization**
- **International cooperation**
- **Outreach**

FIVE DECADES OF INDIAN SPACE PROGRAMME ACCOMPLISHMENTS

- Applications driven, self-reliant programme, Focusing on supporting national development

Present Space Infrastructure : 44 Missions

Operational Satellites
Developmental Satellites
Experimental Satellites
Commercial Satellites

PSLV, GSLV
SLV, ASLV, RLV-TD, Scramjet
Sounding Rockets

Cubesats,
Nanosats, Commercial
Satellites, University Satellite



97 Spacecraft Missions
Incl. 9 Student Satellites

64 Launch Vehicle Missions
2 Reentry Missions

206 Satellites from other countries

MANDATE of ISAC:

- 1.Design, Development and Realisation of Satellites**
- 2.Research & Development**
- 3.Establishment of critical facilities**
- 4.Industry & academia interface**



ISAC, 1984



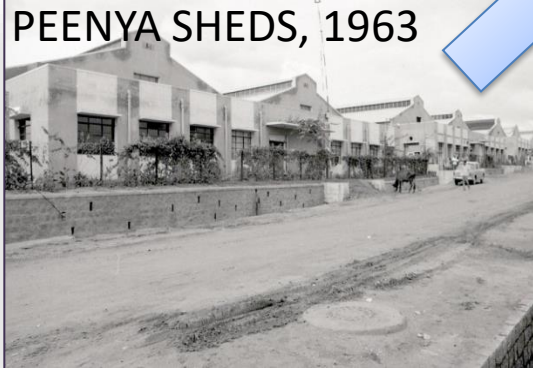
ISITE, 2006



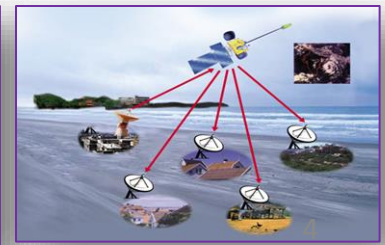
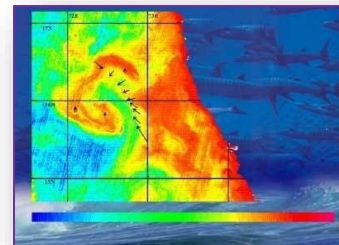
ACHIEVEMENTS

77 +2 Satellites realized
Houses State of art facilities
State of art technologies
Participation /Consultation for
Global Satellite Missions

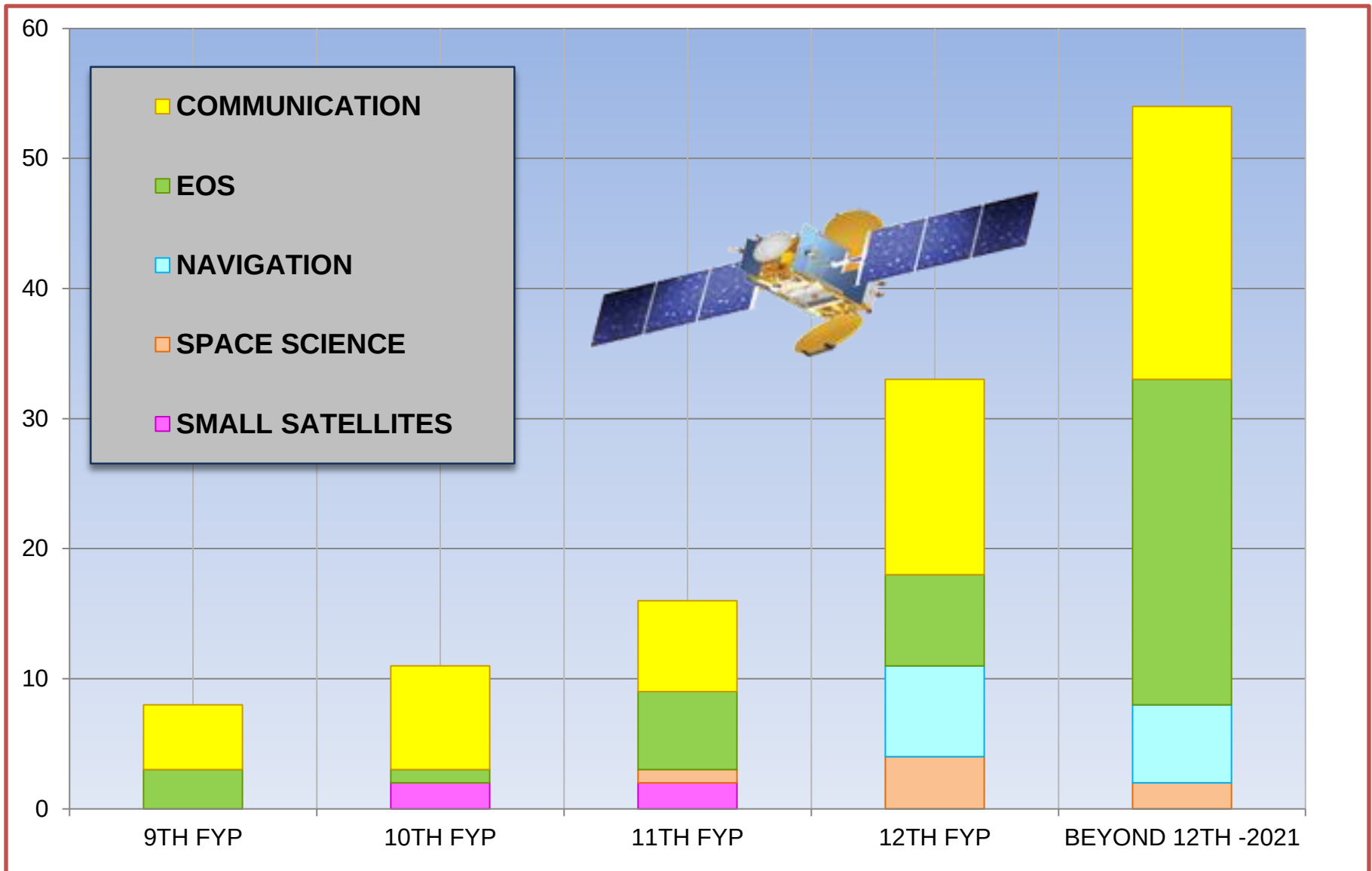
PEENYA SHEDS, 1963



SATELLITE APPLICATIONS



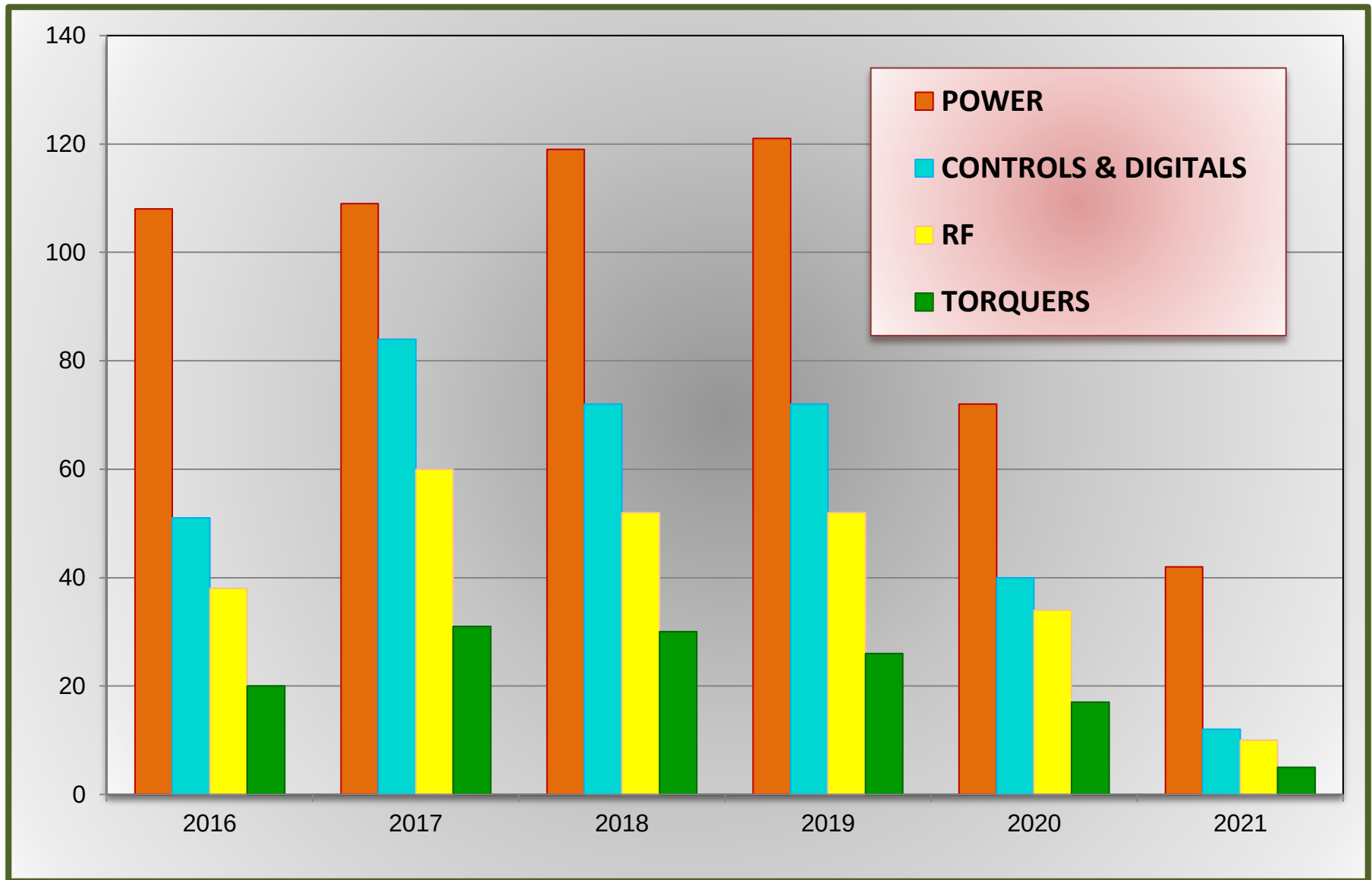
ISAC - TWO DECADES AND PLUS – S/C Growth Trajectory



ESTIMATED PROGRAMME PROFILE 2015-2021 (71 Satellites)

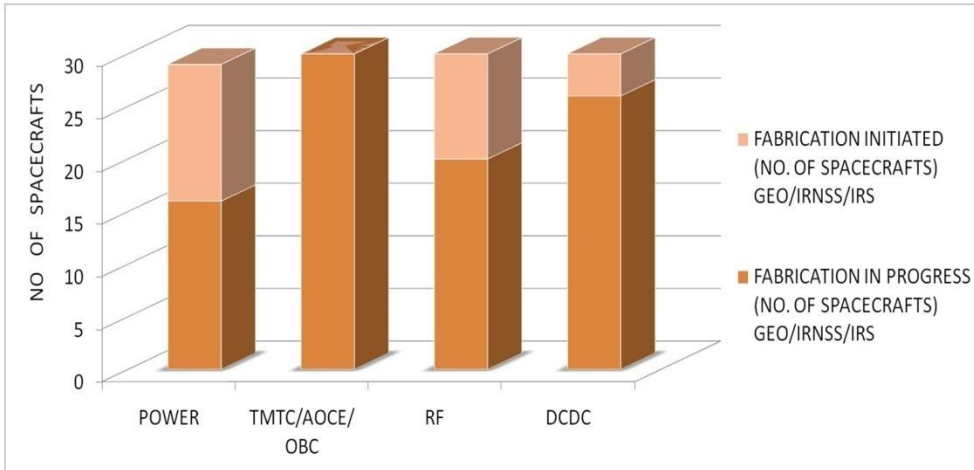
Programme	2015 (Q3...)	2016	2017	2018	2019	2020	2021
Communication	GSAT-15	GSAT-18 SAARCSAT GSAT-19	GSAT-11 GSAT-7A GSAT-17	INSAT-4AR GSAT-9 Ka-Multi Ku-48 S band 12m Ku-24	User Funded-1 Ka/Ka-1 Ku-24 Ext ComSat-1 Ka/Ka-2 User Funded-2 GSAT-11R	Ku-48 GSAT-6A Ext ComSat-2 IDRSS-1	IDRSS-2 Ext ComSar-3 Ka/Ka-3 GSAT-7R
Navigation	IRNSS-1E IRNSS-1F	IRNSS-1G IRNSS-1H	IRNSS-1I IRNSS-1J	IRNSS-1K	IRNSS-S1	IRNSS-S2	IRNSS-S3
Earth Observation		INSAT-3DR SCATSAT-1 CARTO-2C RES-2A EMISAT	GISAT-1 CARTO-2D MICROSAT CARTO-2E	GISAT-2 CARTO-3 OCEAN-3	INSAT-3DS HySIS CARTO-3A RISAT-1A SPADEX RES-3S OCEAN-3A RISAT-1B RES-3MX	Adv. GISAT CARTO-3B RISAT-2A RES-3SA OCEAN-3B RES-3AMx NISAR	RES-3SB RES-3BMx
Space Science	ASTROSAT		CHAND-2		ADITYA-L1		
TOTAL	4	10	10	10	18	12	7

ANTICIPATED FUTURE REQUIREMENTS - A SNAPSHOT

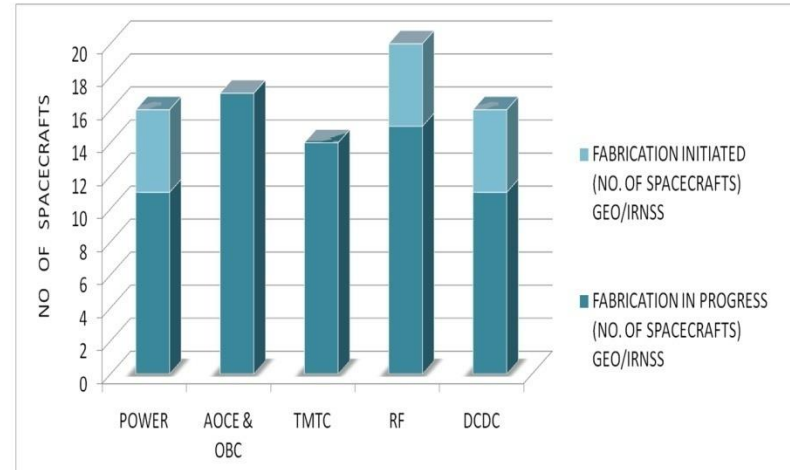


SEG PRODUCTION HARDWARE REALISATION PLAN UPTO OCT 2018 USING RATE CONTRACT

PRODUCTION HARDWARE REALISATION PLAN UPTO OCT 2018
(GEOSAT/IRNSS/IRS PROJECTS)



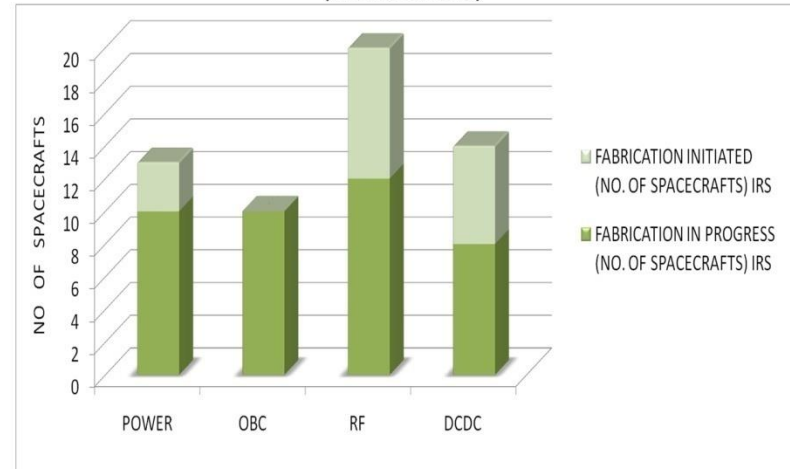
PRODUCTION HARDWARE REALISATION PLAN UPTO OCT 2018
(GEOSAT/IRNSS PROJECTS)



PROJECTS UNDER CONSIDERATION

YEAR	GEO	IRNSS	IRS
2018	GSAT-29 GSAT-20 / 22 / 23 / 24 INSAT-3DS GSAT-7A GISAT-1	IRNSS-11 IRNSS-Ext1 IRNSS-Ext2	CYN-2 RISAT-1A / 2A CARTO-3 / HYSIS OCEANSAT-3
2019	GSAT-25 / 26 / 27 GSAT-30 GISAT-2 GISAT-7C	IRNSS-Ext3 IRNSS-Ext4	HRSAT-1 / 2 / 3 / 4 RES-3S/3/3A OCESANSAT-3A
TOTAL	14	5	15

PRODUCTION HARDWARE REALISATION PLAN UPTO OCT 2018
(IRS PROJECTS)

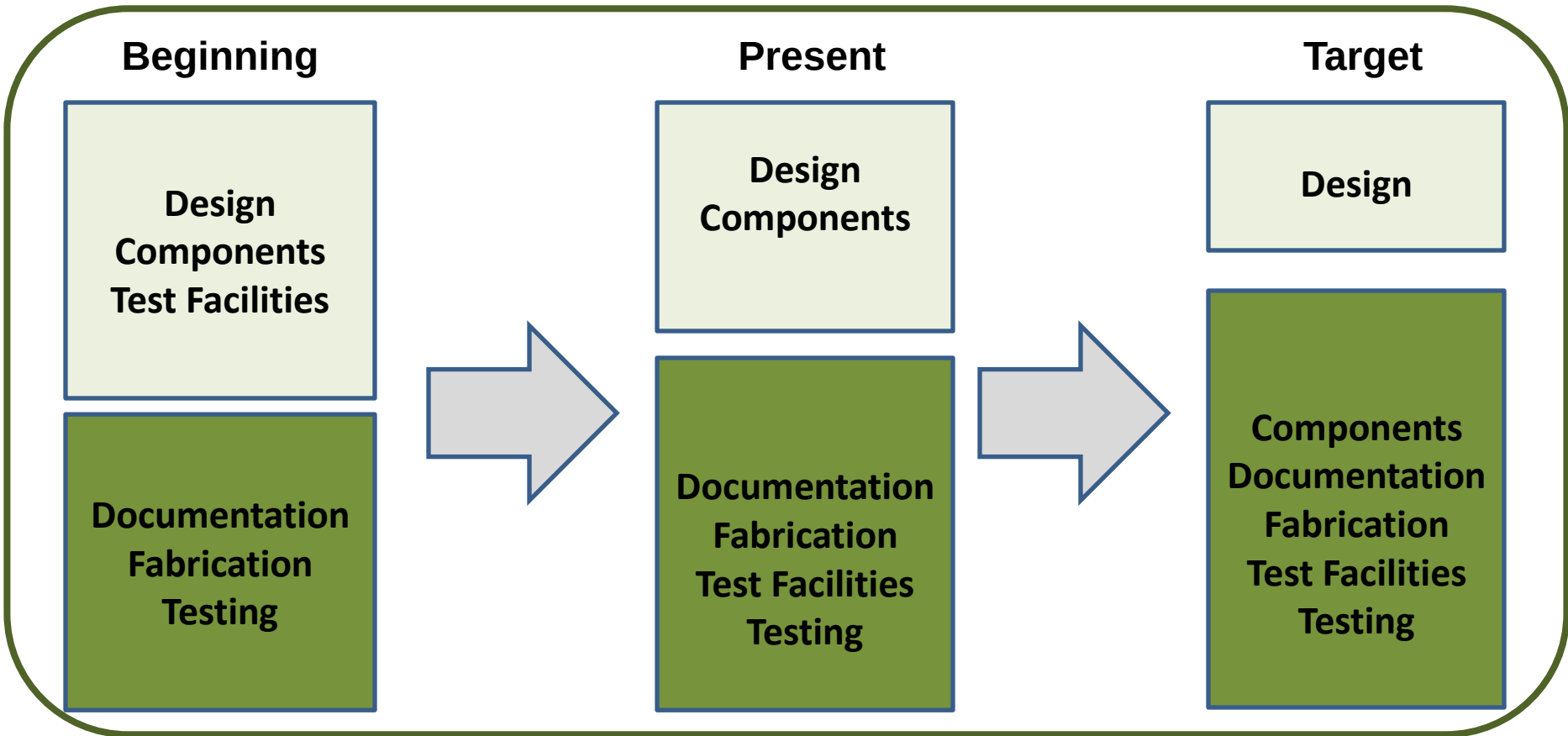


Subsystem	NO. OF PACKAGES REQUIRED PER SPACECRAFT		
	GEO	IRNSS	IRS
POWER	10	8	9
DIGITAL &	10	8	13
RF	15	9	15
TOTAL	35	25	37



Package Handing Over November 2015 to March 2016

Subsystems end-to-end Production Model



Target Outsourcing end-to-end Spacecraft AIT

Target Realization of 350 to 400 Packages per year

Advanced mode of realization

Mode -6

Mode 1

- Fabrication of cards
- Vendor facility
- Consumables by vendor

Mode 2

- Card level testing
- Package level testing
- Equipments and test jig by ISAC

Mode 3

- Fabrication of cards
- wiring of packages
- Card level testing
- Package level testing
- Consumables by ISAC
- Equipments and test jig by ISAC

Mode 4

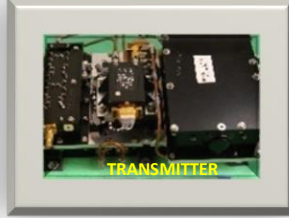
- Fabrication of cards
- wiring of packages
- Card level testing
- Package level testing
- Consumables by Vendors
- Equipments and test jig by Vendors
- Vendor facility
- Equipments and test jig by Vendors

Mode 5

- PCB
- Mechanical housing
- spares accessories, fasteners
- Fabrication of cards
- wiring of packages
- Card level testing
- Package level testing
- Consumables by Vendors
- Equipments and test jig by Vendors
- Vendor facility
- Equipments and test jig by Vendors

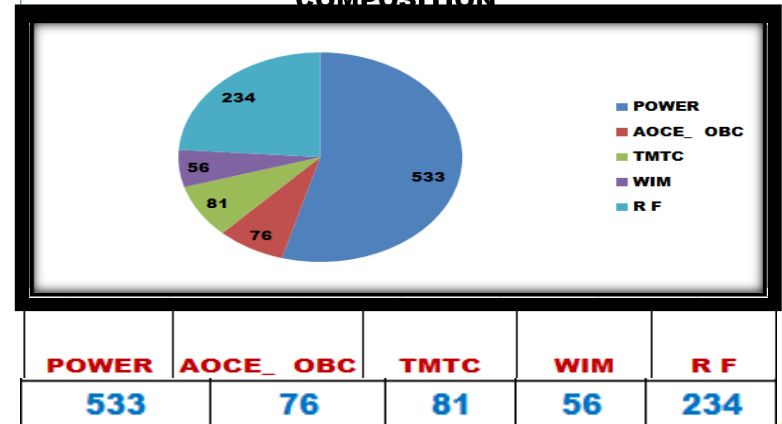
Mode 6 definition

Mode5 + EEE Components



	QUARTER	POWER_	AOCE_						
QUARTER YEAR	NOS.	PKGS	OBC	TMTC	WIM	R F	DC_DC	RELAY	
2019 -	1	1	82	11	7	12	28	160	67
	2	2	14	4	0	0	16	64	35
	3	3	8	2	6	0	9	12	0
	4	4	58	9	8	6	24	159	2
2020 -	1	5	87	8	9	12	24	173	1
	2	6	28	5	6	0	20	93	2
	3	7	8	2	6	0	9	12	0
	4	8	58	9	8	6	24	159	2
2021 -	1	9	87	8	9	12	24	173	1
	2	10	28	5	6	0	20	93	2
	3	11	10	3	7	1	9	4	2
	4	12	65	10	9	7	27	175	5
QUANTITY			533	76	81	56	234	1277	119

AVIONICS HARDWARE -> REQUIREMENT COMPOSITION



- In the context of Indian Satellite Program

**Systems Assembly , Integration &
Testing Contract – Satellite level**

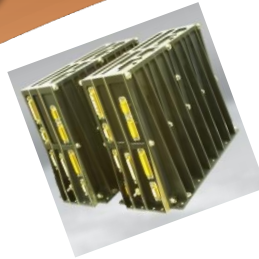
EVOLUTION OF OUTSOURCING

**Fabrication & Testing Contracts -
Subsystem level at Vendors premises**

**Fabrication & Testing Contracts - Package
level at ISAC**

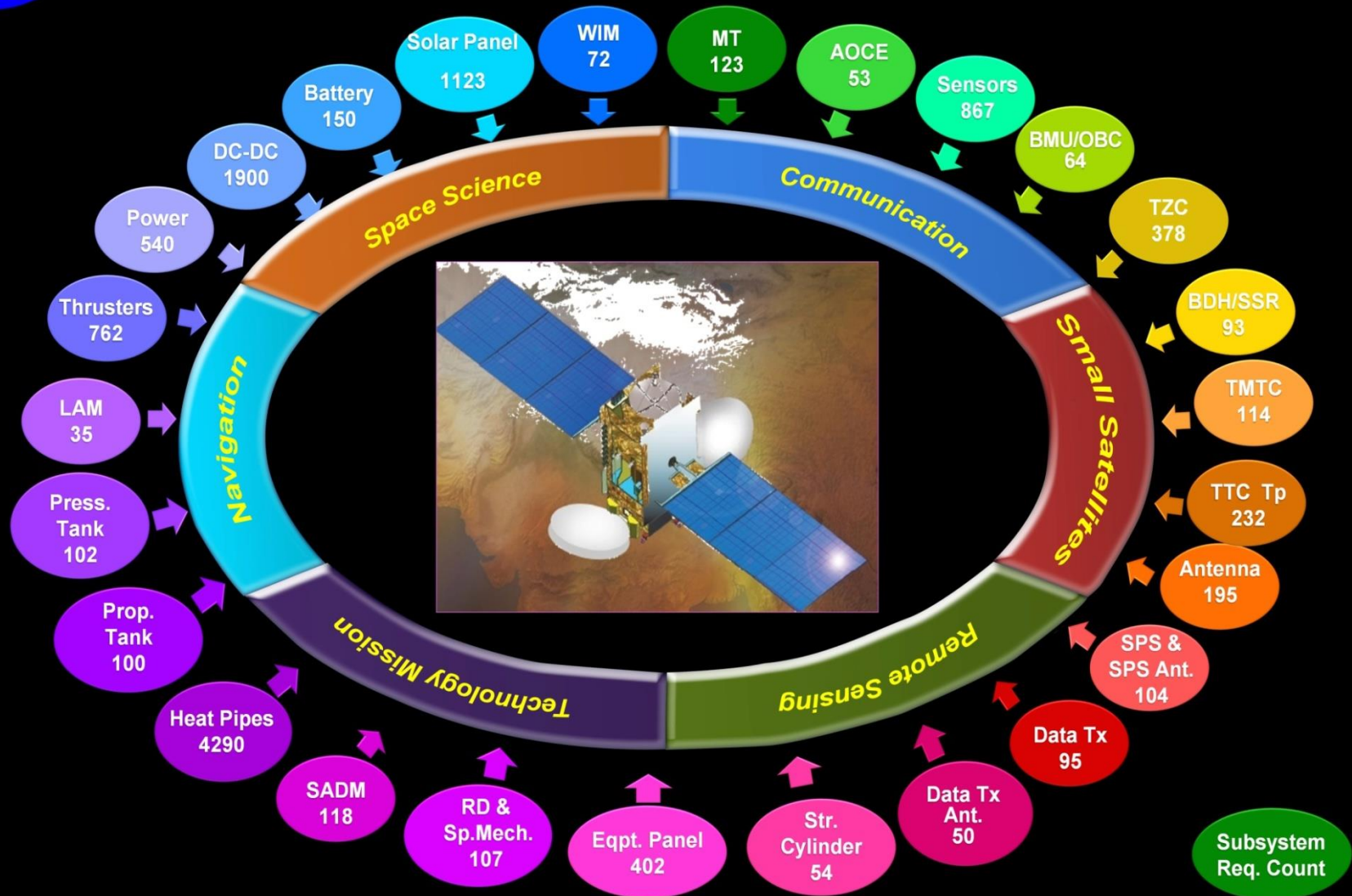
**Fabrication Contract
– PCB Level**

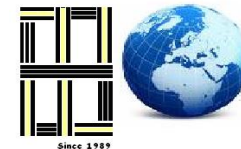
**Manpower
Contract**





JOINING HANDS TO REACH EVERY ONE





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CONCLUSION

The image shows the exterior of a modern, two-story building with a light beige facade. The entrance is covered by a large, open-sided structure supported by thick columns. A series of steps leads up to the glass entrance doors. On either side of the steps, there are long rows of potted plants, mostly yellow flowers. A large tree with green leaves is on the left side of the frame, and a tall, thin lamp post is on the right. The sky is overcast.

AVIONICS FACILITY, ISITE

THANK YOU