Avionics Systems Productionization Requirements, Ongoing Activities & Future Plans

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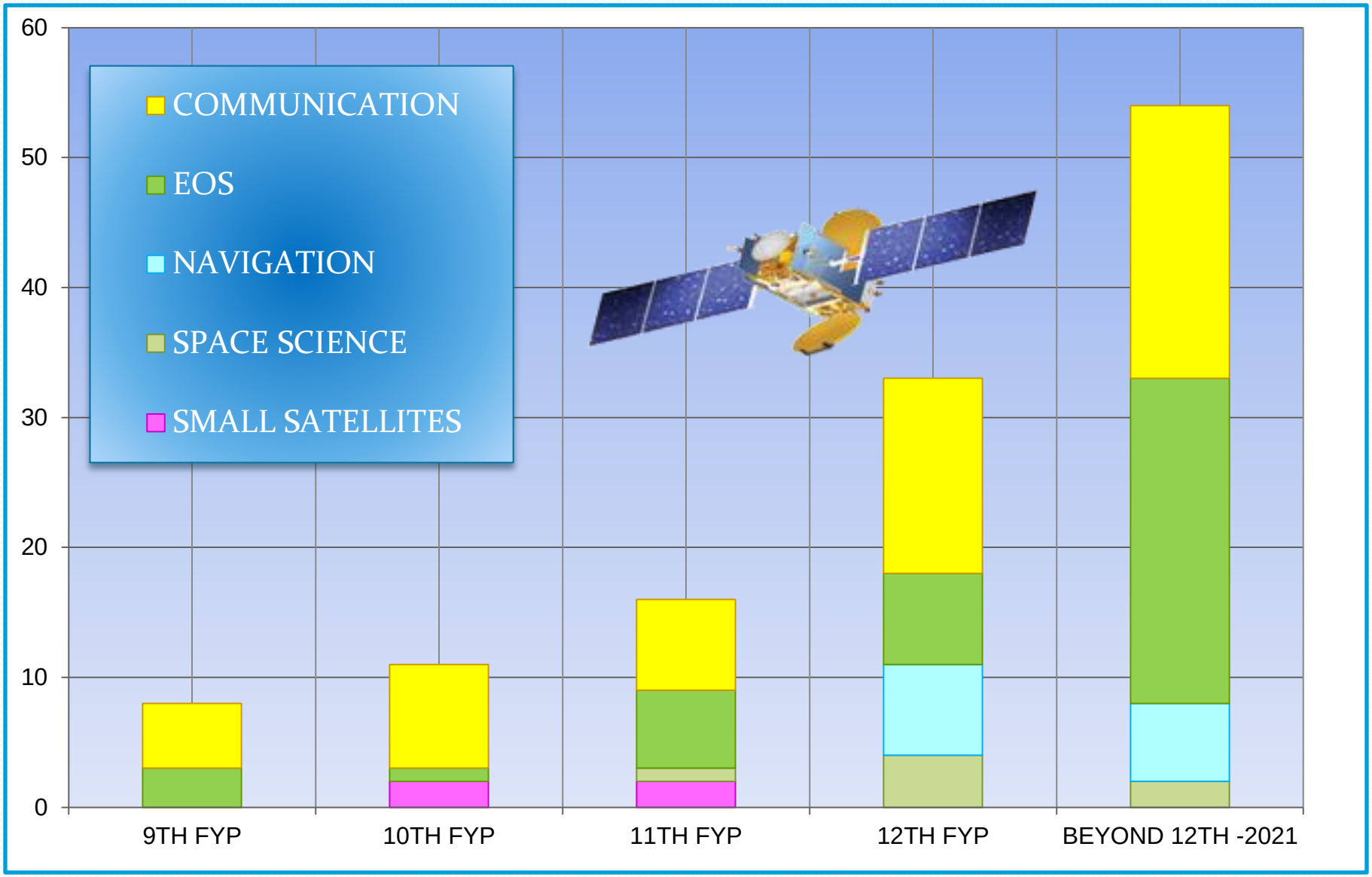
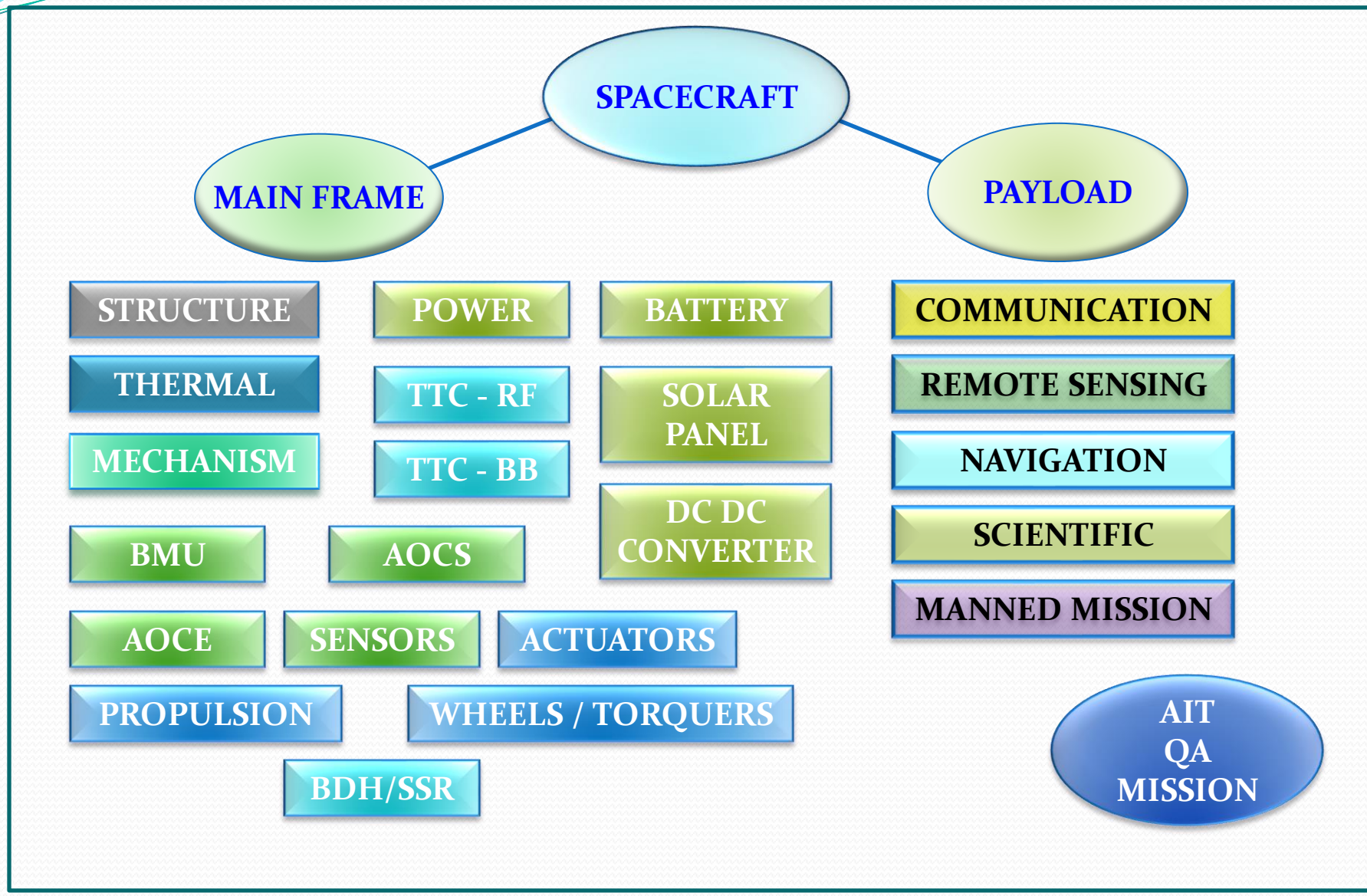
ISAC - TWO DECADES AND PLUS – S/C Growth Trajectory



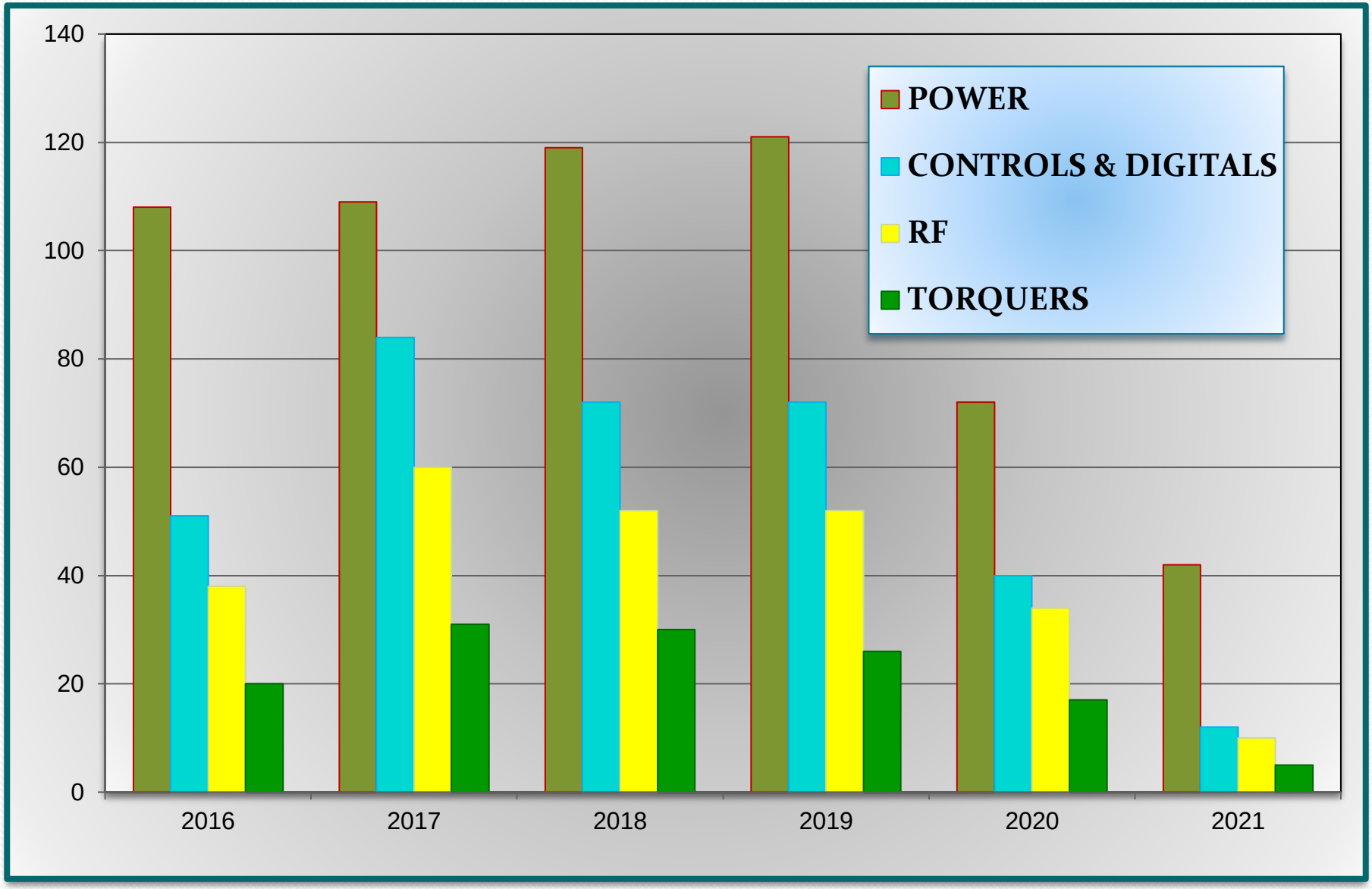
ESTIMATED PROGRAMME PROFILE 2015-2021 (71 Satellites)

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

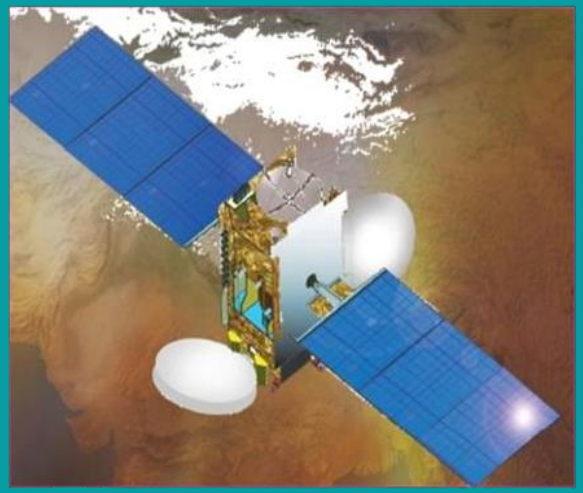
SATELLITE TYPICAL MAJOR HARDWARES



ANTICIPATED FUTURE REQUIREMENTS - A SNAPSHOT



JOINING HANDS TO REACH EVERY ONE

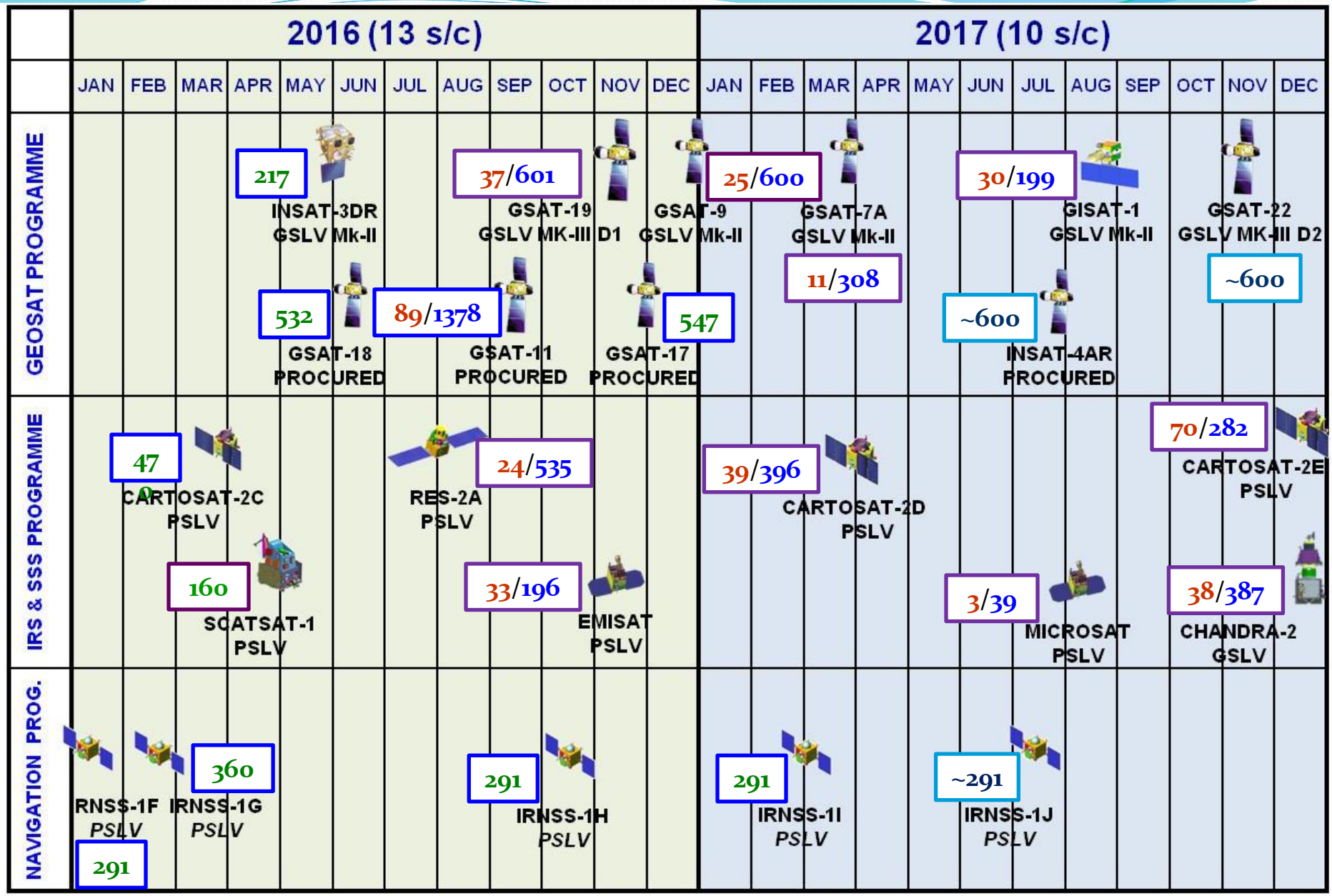


Space Science
Communication
Small Satellites
Remote Sensing
Technology Mission
Navigation

Solar Panel 1123
WIM 72
MT 123
AOCE 53
Sensors 867
BMU/OBC 64
TZC 378
BDH/SSR 93
TMTC 114
TTC Tp 232
Antenna 195
SPS & SPS Ant. 104
Data Tx 95
Data Tx Ant. 50
Str. Cylinder 54
Eqpt. Panel 402
RD & Sp.Mech. 107
SADM 118
Heat Pipes 4290
Prop. Tank 100
Press. Tank 102
LAM 35
Thrusters 762
Power 540
DC-DC 1900
Battery 150

Subsystem Req. Count

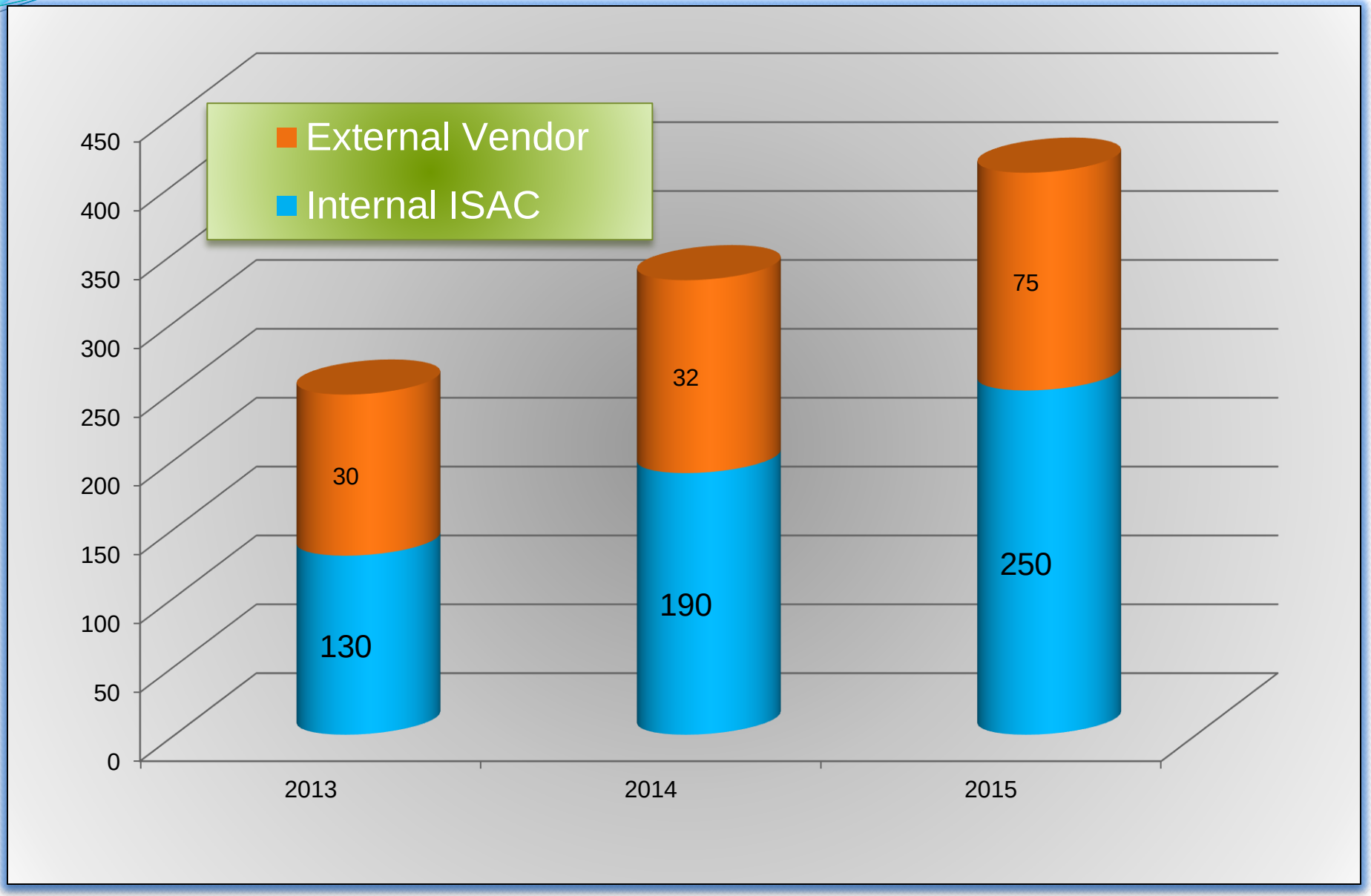
SPA -SPACECRAFT PROGRAMME PROFILE 2016-2017 (23 s/c)



* All dates indicated above are spacecraft readiness schedules

23rd Nov 2015

GROWTH IN DELIVERABLES – A FINE PERFORMANCE !



REPRESENTATIVE HARDWARE PACKAGES

Package Handing Over November 2015 to March 2016

REALIZATION STRATEGY - INITIATIVES

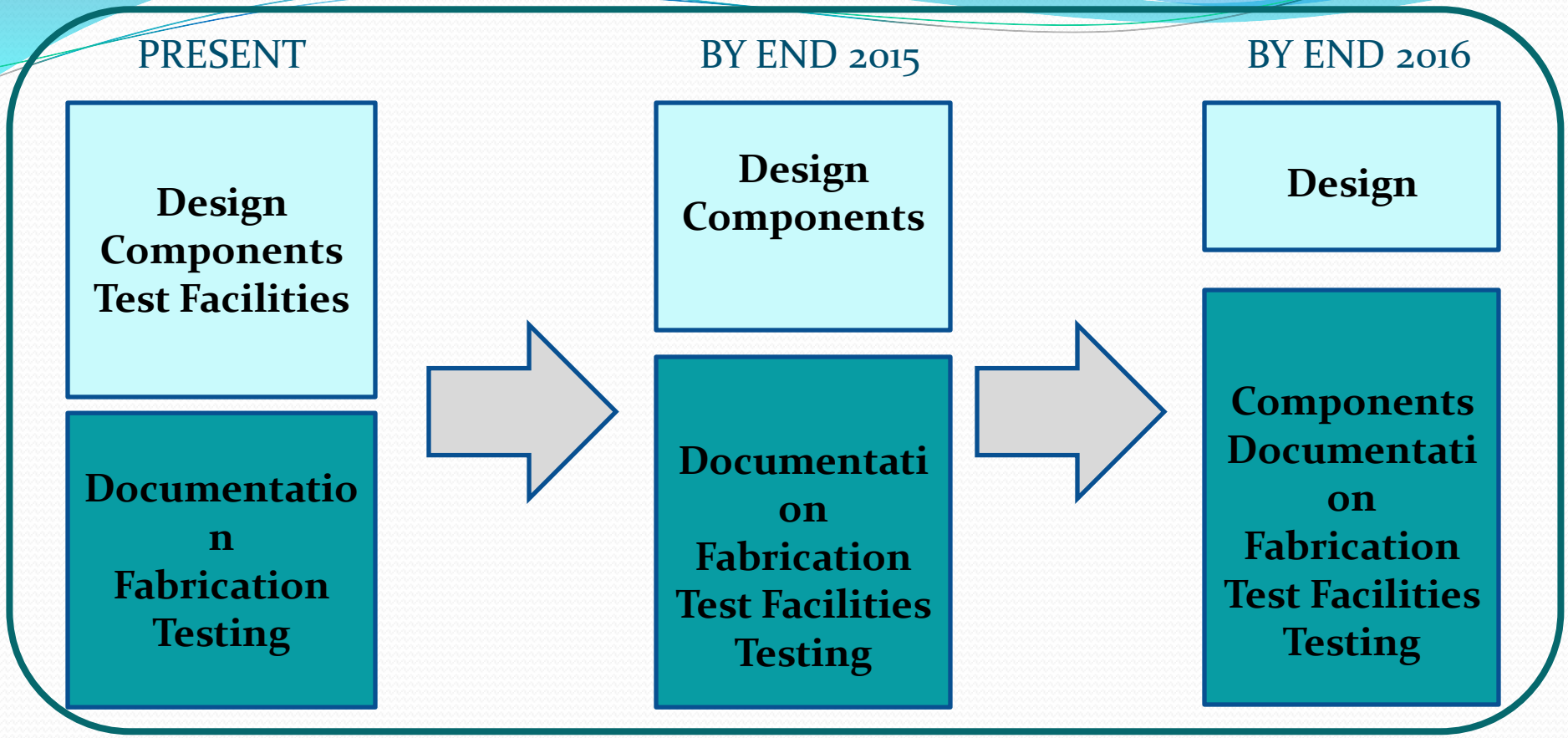
STANDARDISATION

- Further Standardization of main frame systems through modular concept – BMU, standard DCDC, standard RF systems etc
- T & E philosophy for realization of hardware in production mode

PRODUCTIONISATION

- Enhancing the scope of production entity – Cover majority of subsystem
- In house production capability increased thereby doubling the throughput
- Entering into long term contract with self reliant vendors
- New vendor development
- Off –the –shelf availability of standard hardware
- Creation of component and PCB Bank for needed spacecrafts
- Delinking design phase from production phase in project lifecycle

Subsystems end-to-end Production Model



Outsourcing end-to-end Spacecraft AIT

BY END 2016

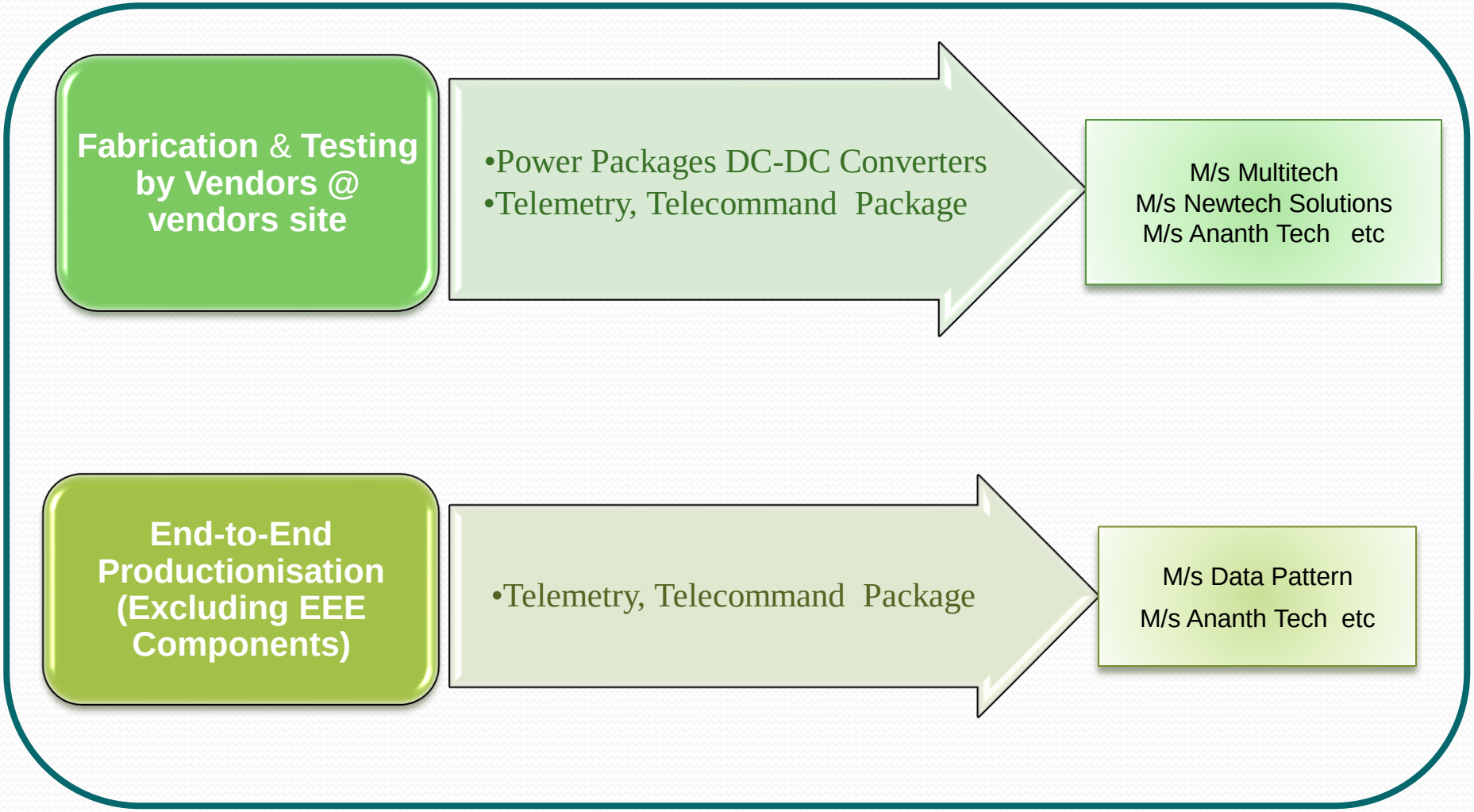
Target Realization of 350 to 400 Packages per year

PRODUCTION MODELS

Example of Present Contracts

Fabrication & Testing In-house	•Distribution packages •Control system packages: BMU & ADE •Digital system packages: SSR& BDH •Communication packages (S-band) •Antenna elements	ISAC/ISITE
Fabrication In-house & Testing by Vendor	•Communication packages •Power packages • DC-DC Converters & Relays •Control system packages	M/s Aidin M/s Ananth Tech M/s Newtech Solutions M/s Keltron & M/s SGS etc
Fabrication & Testing by Vendors @ISAC/ISITE	•Power packages except Distribution • DC-DC Converters •Magnetic Torquers •Thruster Zener packages	M/s Newtech Solutions M/s Ananth Tech M/s High Tech magnetics & M/s Aidin etc

PRODUCTION MODELS……continue



Supply Chain Management

Card Fabrication

- Enhance In-house capacity from 1500 to 2200 Nos
- Enhance External fabrication – 375 to 750 Nos
- Automated soldering to increase through-put.
- Vendor also being qualified for Automated Reflow Line/Process.

Package Fabrication

- Enhance capacity from 250 to 350 Nos per year
- Enhance external fabrication & testing and explore Full outsourcing

DC – DC Converters

- Enhance Production to 400 Converters per year
- Standardized flexible converter realization
- Explore End to End with Industry.

SPA - INFRASTRACTURE

Lab Area Available

CEFD-1 :	1000 sq.m
CEFD-2:	500 sq.m
TED lab :	750 sq.m
New Lab :	2000 sq.m
Mechanical Lab:	300 sq.m
PCB Lab :	500sq.m
HDI Lab:	1000sq.m

CONCLUSION

- SPA/SPA focusing on Production and Productivity.
- SPA geared-up to meet ISAC/ISRO requirements.
- Necessary resources & contracts are/will be in place - All new contracts from Jan 2017
- Infrastructure expansion already in place.
- SEG/SPA gearing up to produce test systems, test consoles, ATE for productivity and reliability.
- Automated Soldering – Solder reflow qualified
- Strategies for next 5 years well mapped.
- ISAC will deliver what the Organisation needs and Beyond with the help of Industries.


AVIONICS FACILITY, ISITE
THANK YOU