POWER SYSTEM

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S3 CSE

What is power system of a satellite?

- Every tech needs power to run.
- Includes generating storing and managing all the power required for a satellite.
- Power Control Unit
- Battery budgeting
- Types of batteries
- Power generation
- Maximum Power Point Tracking(MPPT)

Battery Budgeting

- Battery budgeting is the efficient usage of energy stored in the battery.
- A challenge for small satellites

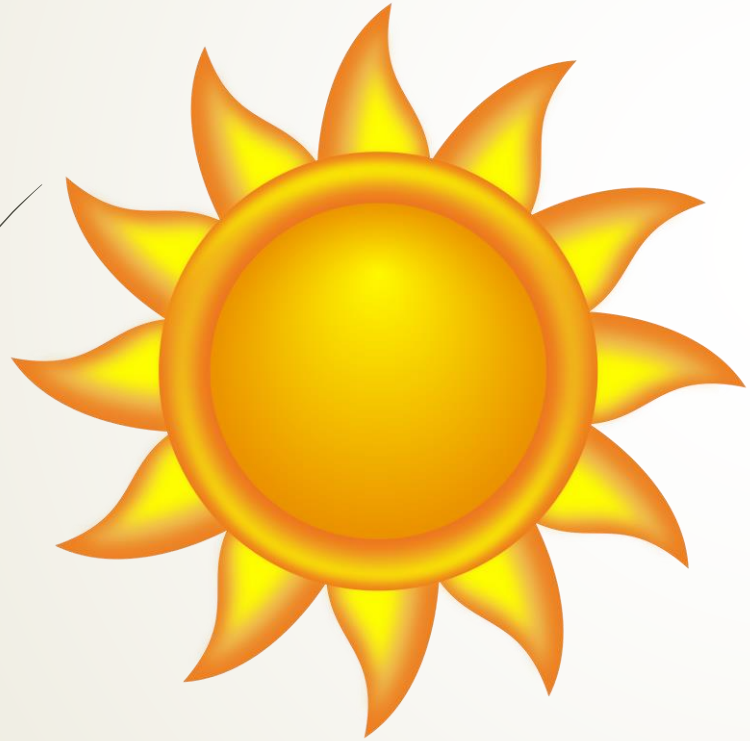
Importance of Battery Budgeting

- During Eclipse (night) of satellite.
- reduce the cost of manufacturing.
- Avoid accidential Turnoff of the satellite

Types of batteries in Satellite

Battery type	Formula	Specific energy (W*hr)/kg	Notes
Hydrogen Fuel Cell	H	275	[3]
Lithium–sulfur dioxide	LiSO2	200	[3]
Lithium–thionyl chloride	LiSOCl2	200	[3]
Lithium-bromine in thionyl chloride	Li-BCX		[2]
Lithum-Iron disulfide	LiFeS2		[4]
Nickel–cadmium	NiCd	30	[3]
Nickel–hydrogen	NiH2	60	[3]
Sodium-sulfur	Na-S		[2]
Silver-cadmium	Ag-Cd		[2]
Silver–zinc	AgZn	100	[3]
Zinc-mercury oxide	Zn-HgO		[2]

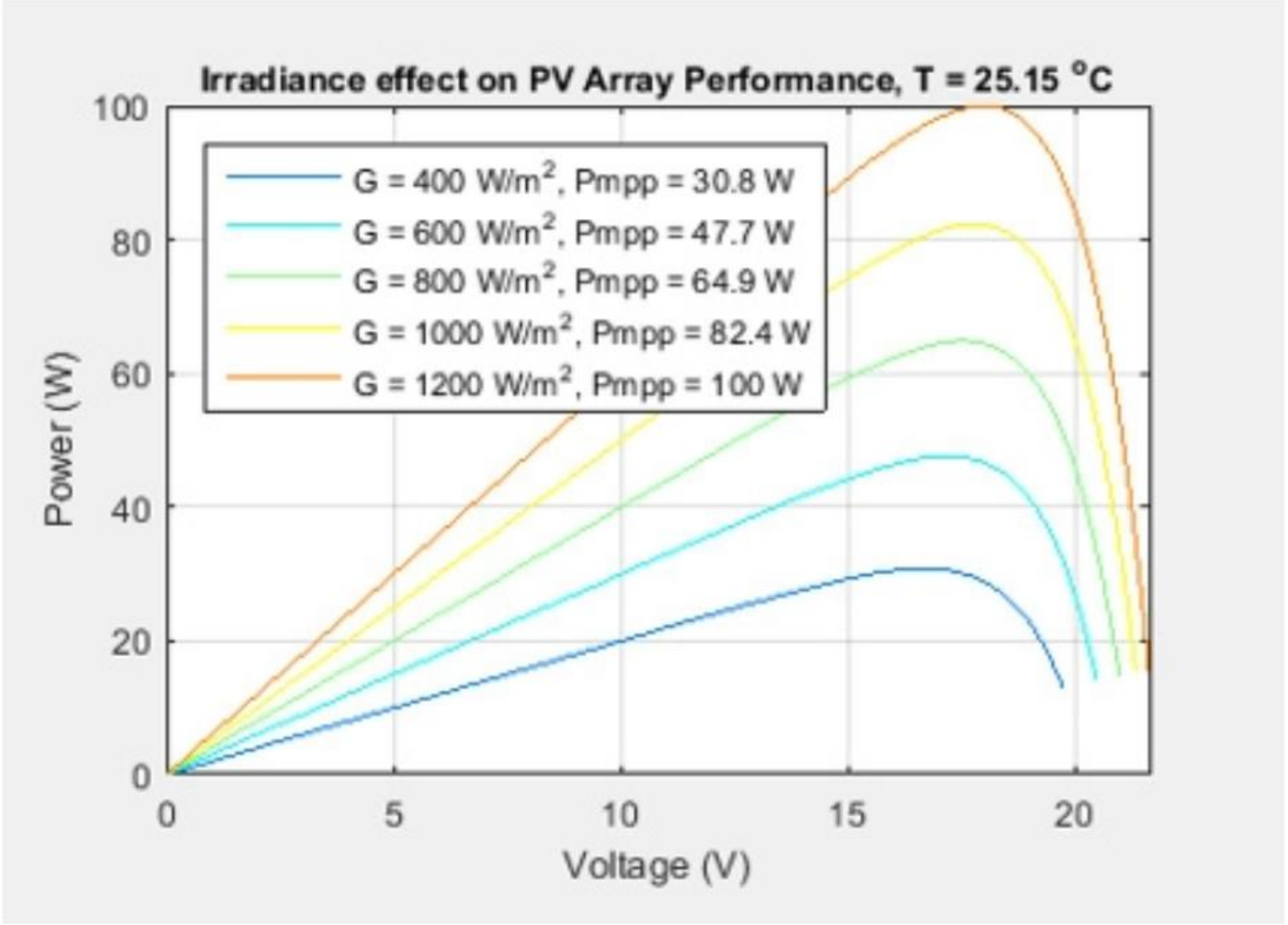
Power generation in Satellites



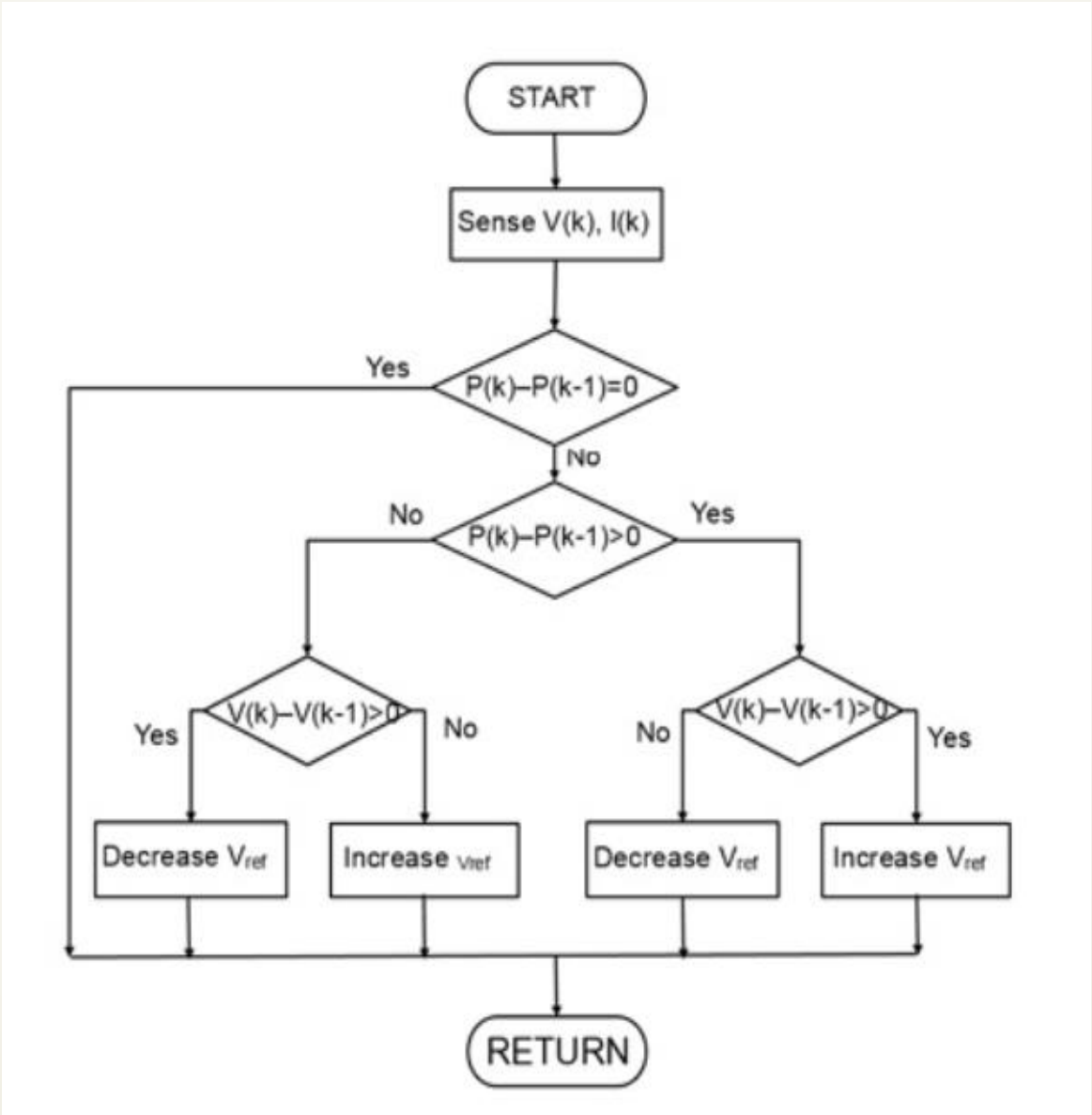
Maximum Power Point Tracking Algorithm

- Method of yielding maximum power from the PV cell
- Implemented in photovoltaic (PV) inverters
- The algorithms account for factors such as variable irradiance (sunlight) and temperature
- Ensures that the PV system generates maximum power at all times

Voltage Power graph for different intensities of light



Perturbation and observation (P&O) algorithm



THANK YOU