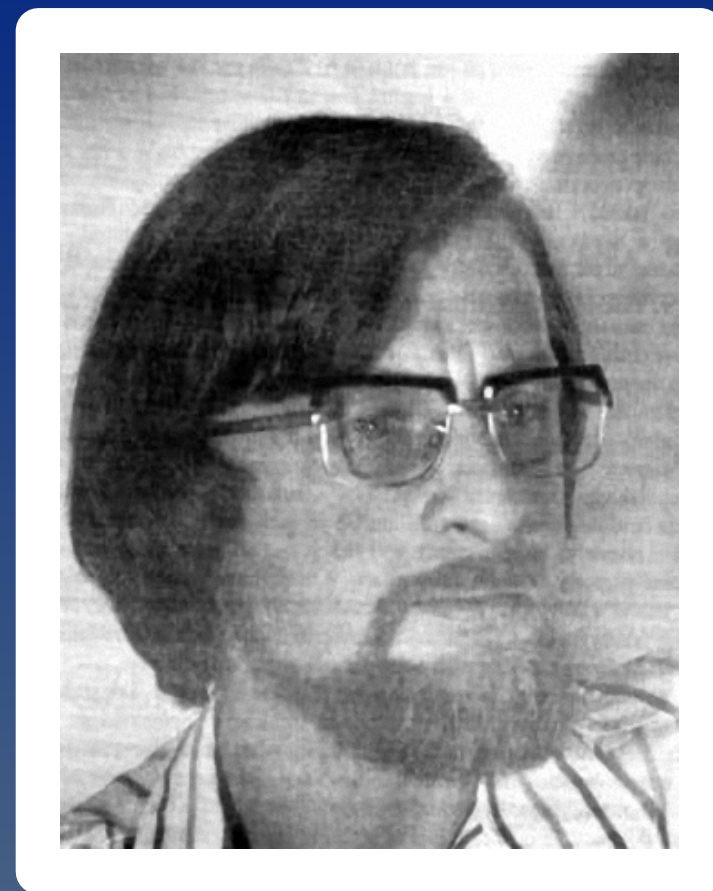




ZAJDEL ASTROPHYSICS MISSION

PARAMETERS

DIMENSIONS	5.5 X 4.5 M
MASS:	1,5 T
OPERATIONAL ORBIT:	LISSAJOUS L2 SUN/EARTH
LIFETIME:	18 MONTHS
PROPULSION:	HYDRAZINE MONOPROPELLANT SYSTEM



JANUSZ ZAJDEL

(1938-1985)

POLISH SCIENCE-FICTION WRITER, PRECURSOR OF SOCIAL AND DYSTOPIAN FICTION.

HE WAS ALSO A TALENTED SCIENTIST IN QUANTUM PHYSICS AND IN ASTRONOMY. HIS INVENTIONS AND IDEAS CAN BE A BASE OF PLENTY RESEARCHES.

ARIANE 5 ECA



ARIANE 5 ECA IS SUITABLE FOR OUR MISSION. IT WILL BE LAUNCHED FROM THE GUIANA SPACE CENTRE

HEIGHT: 53 M

PREDICTED MASS: 780 T

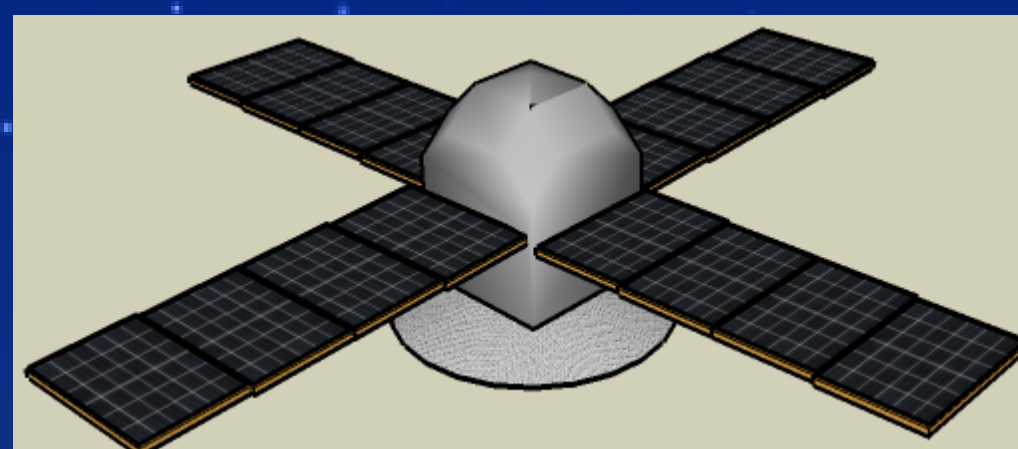
PAYLOAD MASS: 10 T

TOTAL LIFTOFF THRUST: 1340 T

SIMILAR MISSION:

14.05.2009 – LAUNCH OF ARIANE 5 ECA WITH PLANCK AND HERSCHEL ONBOARD

SATELLITE



PAYLOAD

OPTICAL MONITORING CAMERA

RECORDS IN VISIBLE SPECTRUM THE SAME PART OF SKY AS OTHER CAMERAS



X-RAY CAMERA

SIX LIGHT-WEIGHT THIN-FOIL X-RAY TELESCOPES (XRTs) FOR STANDARD OBSERVATIONS. SPIRAL ZONE PLATES¹ ARE BEING CONSIDERED FOR X-RAY FOCUSING



THE HARD X-RAY DETECTOR

THE HARD X-RAY DETECTOR FOR DETECTING PHOTONS WITH ENERGY BETWEEN 10 – 600 KEV



SPECTROMETER

THREE X-RAY IMAGING SPECTROMETERS FOR CONVERTING AN INCIDENT X-RAY PHOTON INTO A CHARGE CLOUD, WHICH COULD BE INVERTED INTO ELECTRIC SIGNALS

GAMMA-RAY CAMERA

CONSTRUCTION BASED ON IMAGER ON-BOARD INTEGRAL SPACECRAFT

ATTITUDE AND ORBIT CONTROL SYSTEM

THE SYSTEM NAVIGATES AND DETERMINES THE ORIENTATION OF THE SPACECRAFT

SUN ACQUISITION SENSOR

USES SUN TO DETECT THE POSITION OF ZAM

STAR TRACKER

COMPARES THE IMAGE OF STARS IN ITS FIELD OF VIEW WITH A STAR MAP OF THE SKY

REACTION WHEELS

SPINNING WHEELS USED TO CORRECT THE POSITION

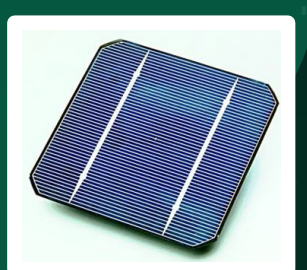
PROPULSION

ENGINE USED TO CORRECT AND MODIFY THE ORBIT AND TRAJECTORY

SERVICE MODULE

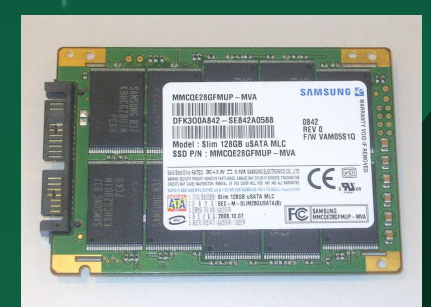
POWER

LILT (LOW INTENSITY, LOW TEMPERATURE) GALLIUM ARSENIDE MULTI-JUNCTION PHOTOVOLTAIC CELLS (NO RISK OF SUN ECLIPSE FROM BOTH EARTH AND MOON)



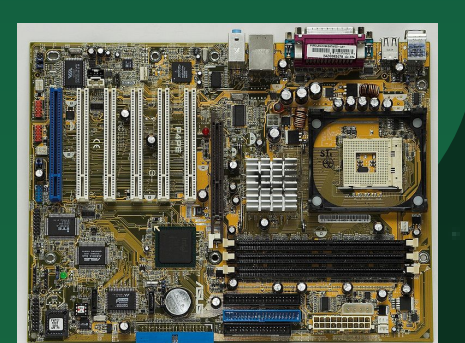
DATA HANDLING SYSTEM

FOUR 100 GB HIGH SPEED SSD DISK. THE SYSTEM WILL MAKE FOUR BACKUP COPIES TO AVOID THE RISK OF DATA LOST



ONBOARD COMPUTER

COMPUTER FOR DATA ANALYSIS, SPACECRAFT NAVIGATION AND COMMUNICATION WITH EARTH.

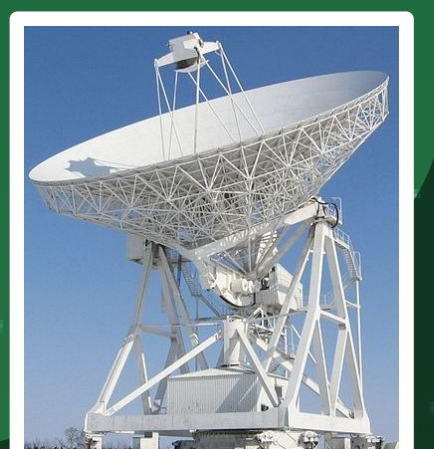


THERMAL CONTROL

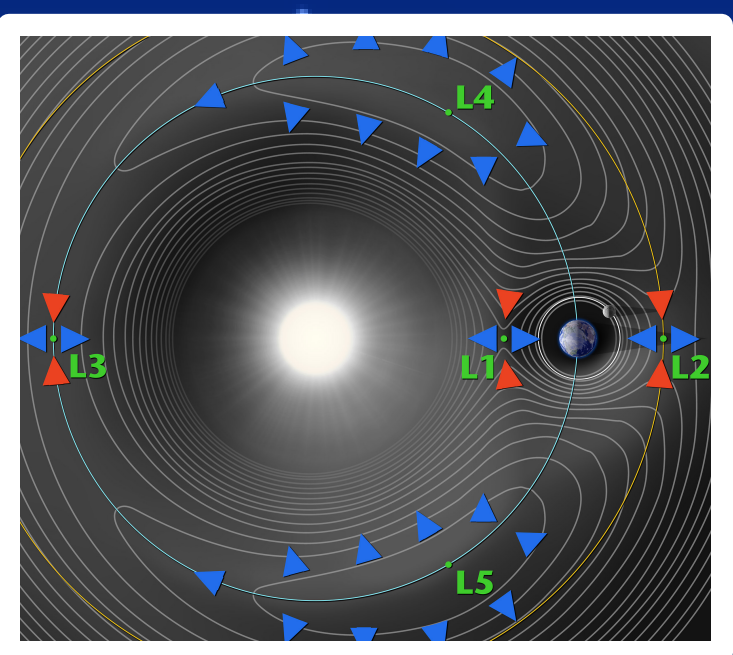
DESIGNED FOR HOLDING CONSTANT TEMPERATURE INSIDE THE SPACECRAFT BY HEATING OR COOLING.

TELECOMMUNICATIONS

THIS SYSTEM CONSISTS OF ANTENNAS AND RADIO EQUIPMENT THAT ARE USED TO EXCHANGE RADIO SIGNALS WITH EARTH.

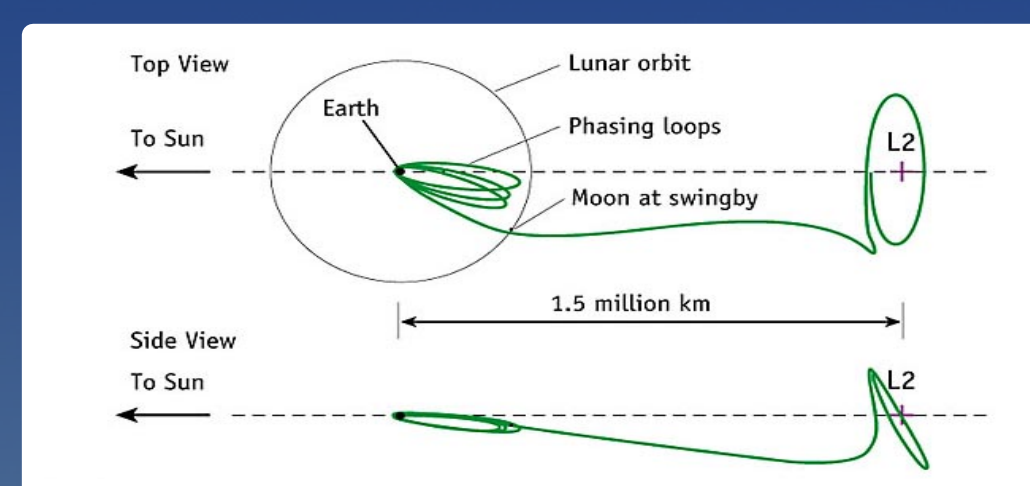


LISSAJOUS ORBIT



THE SPACECRAFT WILL BE CIRCLING AROUND L2 POINT ON A 400 000 KM DIAMETER ORBIT

THE SPACECRAFT WILL FOLLOW AROUND THE LAGRANGIAN POINT L2. THE TRAJECTORY IS SHOWN ON PICTURE 2. THIS ORBIT IS DYNAMICALLY UNSTABLE DUE TO SMALL DISRUPTIONS FROM EARTH AND SUN. THEREFORE PROPULSION SYSTEMS ARE NEEDED TO PERFORM ORBITAL STATION-KEEPING.



COSTS PREDICTIONS

<u>COMPONENTS COSTS:</u>	400 000 000 EUR
<u>ASSEMBLING COSTS:</u>	150 000 000 EUR
<u>ARIANE 5 ECA LAUNCH COST:</u>	100 000 000 EUR
TOTAL	650 000 000 EUR

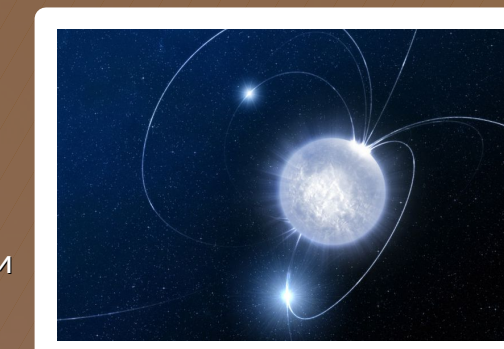
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2. WWW.SPACEFLIGHT101.COM/ARIANE-5-ECA.HTML
3. WWW.ESA.INT/EXPORT/SPECIALS/PLANCK/ SEMRT20YUFF_0.HTML
4. WWW.ESA.INT/ESASC/SEM9WJQXDYD_0_SPK.HTML
5. WWW.ESAMULTIMEDIA.ESA.INT/DOCS/HERSCHEL/HERSCHEL-FACTSHEET.PDF

SCIENCE AIMS

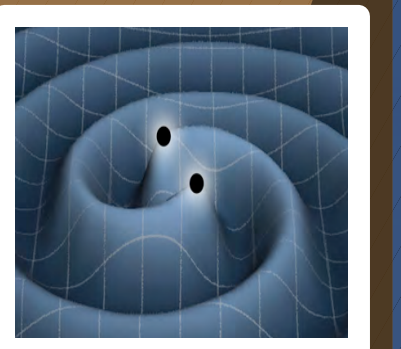
QUARK STAR

IT IS A HYPOTHETICAL TYPE OF STAR COMPOSED OF ULTRA DENSE QUARK MATTER. QUARKS ARE THE FUNDAMENTAL COMPONENTS OF PROTONS AND NEUTRONS, WHICH FORM THE NUCLEUS OF ATOMS. QUARK STARS ARE PREDICTED TO EMIT HIGH ENERGY GAMMA RADIATION. SATELLITE CAN PROVE, THAT THOSE STARS REALLY EXIST. IT WILL BE A HUGE PROGRESS IN QUANTUM ASTROPHYSICS.



SEARCH FOR THE NEW SOURCES OF X-RAY RADIATION

SEARCHING FOR THE NEW SOURCES COULD GIVE SCIENTISTS MORE EXAMPLES, WHICH COULD PROVE OR DENY MANY THEORIES. ZAM WILL ESPECIALLY LOOK FOR THE HIGH-MASS X-RAY BINARIES (HMXB) AND FOR NEW TYPES OF QUASARS.



SCIENCE OBJECTIVES

BY USING XRT WITH THE EFFECTIVE AREA OF 250 CM² WE COULD MEASURE PHOTONS WITH AN ENERGY OF 8 KEV. THIS COULD HELP US IN FINDING NEW TYPES OF STARS AND MAKE NEW, MORE ACCURATE SKY MAPS. IN ZAM WE USE SIX XRTs FOR FINDING NEW SOURCES OF RADIATION AND EXPANDING OUR KNOWLEDGE ABOUT THEM.

COOPERATION WITH ONGOING MISSIONS LIKE INTEGRAL OR LISA WILL GIVE OUR RESEARCH NEW POSSIBILITIES OF WORK AND NEW DEVICES, WHICH COULD FURTHER HELP US IN SEARCHING FOR NEW STARS AND FULFILLING OUR AIMS.

