Czech Space Research Centre

CSRC in the European space business since 1994





















Version 2015-B



1. Introduction

Reykjavik



CSRC was established in 1994 with the aim to promote and develop space activities in the Czech Republic.





BRNO CITY

- ✓ Second largest Czech City
- ✓ 400.000 inhabitants
- ✓ Industrial Centre
- ✓ University Centre



KROMERIZ CITY

- ✓ A Beautiful UNESCO City
- ✓ 35.000 inhabitants
- ✓ Historical & Culture Centre
- ✓ Secondary Schools Centre

2. Main Activities



Complex Space Electronics Project Realization

Electronics Design and Cleanroom Manufacturing

Design Group

- Hardware & Software Design
- Analyses and Simulations
- Testing and Integration
- High Precision Mechanics Design
- Prototype production



- Space Electronics Manufacturing
- FM & EM PCB Assembly
- Own Cleanroom 100.000 Class
- ESA Certificated Operators
- ESA Qualified Procedures





3. CSRC Space Project History



CSRC - SPACE PROGRAMME & PROJECT SUMMARY

COMPLETED & RUNNING SPACE ACTIVITIES SINCE 1996

Num.	Programme Name	CSRC Role / Delivery	Direct and Final Customer	Duration of Project	Delivery Type	In Space / Mission Duration	Comments
1	ELISA – Laser Head - Power Supply and Modulator Driver	Sub-Contractor	ESA / LusoSpace / LZH	Active since 2/2014	EM, EQM	Planned	Complex Design & Manufacturing
2	EUCLID - Design of the EUCLID SVM Electrical Simulator	Prime Contractor	ESA / TAS-I / Iguassu	Active since 10/2013	Study	N.A. in the Study Phase	Electrical Simulator for the Euclid Mission
3	Study on Opportunities for Co-operation	Sub-Contractor	Jena-Optronik	Active since 6/2013	FM	Planned	PCB Assembly for ASTR010
4	Preliminary Design of the Power & OBDH Controller Subsystems for SABIP	Sub-Contractor	ESA / TAS-D	Active since 5/2013	Study	N.A. in the Study Phase	SABIP Payload Stratospheric Balloon Mission
5	Evaluation of Supercapacitors and Impacts at System Level	Sub-Contractor	ESA / Astrium SAS-F / EGGO / TU BM	Active since 3/2012	EM	N.A. in the Study Phase	Complex Design & Manufacturing
6	Space-based ADS-B Payload Development for Air Traffic Surveillance	Sub-Contractor	ESA / TAS-D	Acrive since 6/2011	EQM, PFM	Planned	SABIP / MAIT Programme, Manufacturing, Testing
7	SATRAM - Space Application of Timepix-Based Radiation Monitor	Prime Contractor	ESA / IEAP	Active since 2011	FM	YES: Launched 6/2013	Complex Design & Manufacturing
8	SMT Assembly Verification Programme According to ECSS-Q-ST-70-38	Prime Contractor	ESA	Active since 2011	Qualification	N.A.	SMT Manufacturing Qualification
9	Solar Orbiter - RPW / Phase B + Phase C/D	Prime Contractor	ESA	Active since 2011	FM	Planned	Qualification for SMT PCB Assembly
10	Solar Orbiter - STIX / Phase B + Phase C/D	Prime Contractor	ESA	Active since 2011	FM	Planned	Complex Design & Manufacturing
11	L-DEPP - Lunar Lander	Sub-Contractor	ESA / Czech Academy of Science	Active since 2011	FM	Planned	Complex Design & Manufacturing
12	ACES / ELT - European Laser Timing for ISS	Sub-Contractor	ESA / Astrium-D	Active since 2010	FM	Planned	Complex Design & Manufacturing
13	Taranis	Sub-Contractor	Czech Academy of Science / CNES	Active since 2009	EM	Planned	Complex Design & Manufacturing
14	Preparatory Activities for MTG Participation	Prime Contractor	ESA / Astrium-D	2009 - 2011	Qualification	N.A.	Qualification for PCB Assembly Procedures
15	Langmuir Probe Experiment	Sub-Contractor	ESA / Czech Academy of Science	2010 - 2011	Feasibility Study	N.A.	TBD by ESA
16	Space-based AVX Tantal Capacitors - Test PCB Assembly	Sub-Contractor	ESA / EGGO / AVX	2011	Test PCB Samples	N.A.	PCB Assembly - 90x Test PCBs
17	SWARM - FM3 PCB Assembly	Sub-Contractor	ESA / VZLU / Astrium-D	2010 - 2011	FM	YES: Launched 22.11.2013	PCB Assembly - 15x FM3
18	SWARM - FM2 PCB Assembly	Sub-Contractor	ESA / VZLU / Astrium-D	2010 - 2011	FM	YES: Launched 22.11.2013	PCB Assembly - 15x FM2
19	SWARM - Spare PCB Set - FM PCB Assembly	Sub-Contractor	ESA / VZLU / Astrium-D	2011	FM	Spare parts for space	PCB Assembly - 10x EM
20	SWARM - PFM PCB Assembly	Sub-Contractor	ESA / VZLU / Astrium-D	2009 - 2010	PFM	YES: Launched 22.11.2013	PCB Assembly - 15x PFM
21	SWARM - EM PCB Assembly	Sub-Contractor	ESA / VZLU / Astrium-D	2007 - 2008	EM	N.A.	PCB Assembly - 15x EM
22	TEASER - FM PCB Assembly	Sub-Contractor	VZLU (CZE)	2007	FM	YES / exact date unknown	PCB Assembly - 15x FM
23	PROBA 2 - DSLP, TPMU	Sub-Contractor	ESA / Czech Academy of Science	2006	EM, FM	YES: 2009 up to now	Complex Design & Manufacturing
24	ECCU - FSL Bath 1 (Phase C/D) - FM PCB Assembly	Sub-Contractor	BLU Electronic (ITA)	2005 - 2006	FM	YES / exact date unknown	PCB Assembly - 15x FM
25	GOME 2 - FM Assembly	Sub-Contractor	Laben (ITA) / ESA	2003	FM	YES / exact date unknown	PCB Assembly - 6x FM
26	PCDF - CCD Head, OVCBD, OVCBI	Sub-Contractor	CEDO / Astrium-D	2002 - 2004	EM, FM	YES / exact date unknown	PCB Assembly - 3x EM + 3x FM
27	NODE-3 - External Harness	Sub-Contractor	Laben (ITA) / ESA	2002			External Harness - 63 cables (30m length each)
28	MISC - FM PCB Assembly Activities in the CGS Cleanroom / Milano	Sub-Contractor	Carlo Gavazzi Space (ITA)	2001 - 2003	FM	YES / exact date unknown	
29	DEMETER - Langmuir Probe	Sub-Contractor	Czech Academy of Science / CNES	2001	FM	YES / exact date unknown	Complex Design & Manufacturing
30	SMART 1 - EPDP Unit	Sub-Contractor	Laben (ITA) / ESA	2000 - 2002	EM. FM	YES: 2003 - 2006	Complex Design & Manufacturing
31	SATELCOM - FM PCB Assembly	Sub-Contractor	Laben (ITA) / ESA	1999 - 2000	FM	YES / exact date unknown	PCB Assembly - 21x FM
32	METOP - FM PCB Assembly	Sub-Contractor	Laben (ITA) / ESA	1999 - 2000	FM	YES / exact date unknown	PCB Assembly - 19x FM
33	INTEGRAL - FM PCB Assembly	Sub-Contractor	Laben (ITA) / ESA	1999 - 2000	FM	YES / exact date unknown	PCB Assembly - 14x FM
34	INTEGRAL - PSAC	Sub-Contractor	Laben (ITA) / ESA	1998 - 2001	EM, STM, FM1, FM2	YES: 2002 - 2014 (plan)	Complex Design & Manufacturing
35	EPIC - FM PCB Assembly	Sub-Contractor	Laben (ITA) / ESA	1998 - 1999	FM	YES / exact date unknown	PCB Assembly - 22x FM
36	MOCAP - External Harness	Sub-Contractor	Eurospace (GER)	1996 - 1998	FM	YES / exact date unknown	External Harness Mounting

4. CSRC Units Operating in the Space





INTEGRAL - PSAC - 2001 Plastic Scintillator Anti-Coincidence Flight unit for photomultiplier high-voltage control



DEMETER - I/V Converter - 2001 I/V Converter for Langmuir Probes pA to µA current range to voltage



SMART1 - EPDP - 2002 First European Mission to the Moon EPDP Measuring Unit, CAN bus



PROBA2 - DSLP&TPMU - 2006 Data Processing & Communication Unit 2x I/V Converters for Langmuir Probes



SWARM - MAC - 2011 Microaccelerometer PWR, DPU, Sensor Units



PROBA-V - SATRAM - 2013 Multispectral Earth Observation Time-Pix Radiation Monitor

5. Currently Running Space Projects



SATRAM

Space Application of TimePix-based Universal Radiation Monitor

The objective is to launch technology demonstrator flight hardware based on a detector from TimePix family on the Proba-V satellite.

ISS/ACES/ELT INSTRUMENT

European Laser Timing for ACES

Complex FM design & manufacturing of the atomic clock synchronization module for the ISS.





SUPERCAP

Evaluation of Supercapacitors and Impacts at System Level

The Bank of Supercapacitors as the final EM product shall be capable to demonstrate the added value of the use of supercapacitors in telecom spacecrafts. The main issues are overall platform cost & mass savings.

6. Other Space Projects



SOLAR ORBITER RPW/STIX

CSRC contribution to the both RPW and STIX are power supply modules. The RPW powering subsystem consists of the Low-Voltages Power Supply (LVPS) and the Power Distribution Unit (PDU). The two units constitute one single module called LVPS-PDU, which is a commonly shared resource within RPW.

SABIB

The objective is to provide all the MAIT activities including relevant documentation related to a space-based ADSB receiving system, targeting the possibility of an In-Orbit Demonstration mission. It is focused on air traffic management services for the worldwide areas.







FM/EM PCB ASSEMBLY

EPIC, METOP, DEMETER, INTEGRAL, GOME 2, SMART-1, PSAC, CLUSTER II, SWARM/TEASER, PROBA-2, MONSTER, NODE 3, SATELCOM, PCDF-CCD HEAD, LANGMUIR PROBE and others...

7. CSRC in ESA Tenders





The Czech Republic in ESA

- » 18th Member State since 14.11.2008
- » Czech Industry Incentive Scheme till 2014
- » ESA Calls for Czech Outline Proposals

CSRC is an active bidding SME

1st ESA/CZE Call – AO 6052/2009

- » AO Subject:

» CSRC Proposal 1: Preparatory Activities for MTG Participation "C" Group = Preparatory Activities

- *» ESA Decision:* Selected for implementation
- » Current Status: Successfully completed

2nd ESA/CZE Call – AO 6647/2010

» CSRC Proposal 1: » AO Subject: » ESA Decision: » Current Status:	Space Application of Timepix-Based Universal Radiation Monitor "A" Group = Flight Hardware Selected for implementation Running
» CSRC Proposal 2: » AO Subject: » ESA Decision: » Current Status:	SMT Assembly Verification Programme According to ECSS-Q-ST-70-38 "C" Group = Preparatory Activities Selected for implementation Running

8. Organization Structure





9. Certificates & Audits

Based on ESA's internal evaluation CSRC was selected as a leading representative of the Czech SMEs operating in the field of Complex Space Electronics Design and Cleanroom Manufacturing.



As an ESA audited Czech company, **CSRC** is an **ATTRACTIVE BUSINESS PARTNER** for the whole international space industry.

UKAS

MANAGEMENT

SYSTEMS 0043

URS is a member of Registrar of Standards (Holdings) Ltd.

CERTIFIED ____QUALITY

MANAGEMENT

SYSTEM

10. CSRC and The University



The CSRC significant scientific and research base is the

Brno University of Technology Faculty of Electrical Engineering and Communication Czech Republic

with its broad material and personal technical background proved by a long-term collaboration in many international research projects.









- 30,000 Students at BUT
- 8 Faculties at BUT
- 4,000 Students at the FEEC
- **12** Departments at the FEEC

11. Contacts



Thank you for your attention.

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