



PARADIGMA
technologies

KEY POINTS

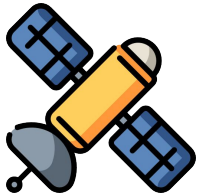
- **COMPANY INTRODUCTION**
Who we are and what we do
- **HOW WE JOINED COCHISA PROJECT**
From proposal to implementation
- **COCHISA PROJECT OVERVIEW & STATUS**
Objectives, our role, and key outcomes
- **LESSONS LEARNED**
Key recommendations for smooth execution and monitoring
- **INSIGHTS AS EVALUATOR**
Tips for strong proposals and joining winning consortia
- **Q&A**

WHO WE ARE



PARADIGMA TECHNOLOGIES is an innovative **space start-up** company founded in December **2019** and based in Sezana (Slovenia).

We aim to empower **global connectivity**, **Earth observation**, and **space exploration** through **state-of-the-art technologies** that drive **progress**, **innovation** and **sustainability** in the New Space industry.



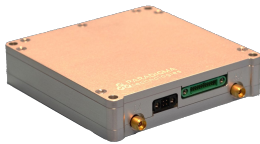
PARADIGMA TECHNOLOGIES offers **high frequency miniaturized telecommunication solutions** for small satellites.

WHAT WE DO

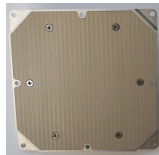
→ Know-how

- Space Engineering
- RF & Microwave
- Wireless communication
- Data and clocking interfaces
- Linux and embedded SW
- Testing and qualification

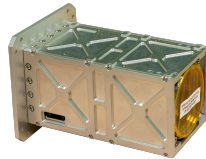
→ Space Products



- K/Ka Band Transponder
- Ka Band Receiver
- K Band Transmitter
- Q Band Transmitter



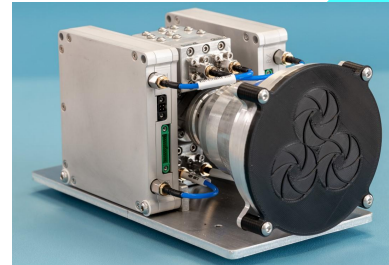
- Patch Antennas
- Horn Antennas
- Reflectors



- Custom Space Telecommunication Systems

→ Experience on space telecommunication platforms

- MOCKINGJAY K/Ka Band SDR Telecom system
- GENA-OT K/Ka Band SDR Telecom system
- Athene-1 K/Ka Band Transceiver + K/Ka Band Horn Antenna
- OrbitGuard-2 K/Ka/Q Band Redundant Telecom system
- OrbitGuard-3 X Band Transmitter + X Band Patch Antenna
- Endurance-1 Ku Band Redundant Telecom system
- Máni Ka Band SDR Downlink Telecom system for Moon orbit



OUR SPACE MISSIONS (2025)



- [MOCKINGJAY](#) on SpaceX Transporter-13 (15/03)
- [GENA-OT](#) on SpaceX Transporter-14 (June/July)
- [OrbitGuard-2](#) on SpaceX Bandwagon-4 (24/08)
- [Athene-1](#) on SpaceX Transporter-15 (December)



our first mission!

INSTITUTIONAL PROJECTS

- **2022 - 2025:** ESA - Multiband Ka/Q Band Tunable Bandpass Filter IC for SDR.
- **2023 - 2024:** Slovenia - Q/V Band Telecommunication modules for smallsats
- **2023 - 2025:** EU - Development of a Ka Band Beamformer IC for space “COCHISA”.
- **2024 - 2029:** ESA - Development of the High Speed Downlink Radio for “Máni” mission (next European Lunar Reconnaissance Orbiter)
- **2025 - 2026:** ESA - Application of Lyo-Gold technology in mmWave bandpass filters

JOINING COCHISA

- **26/10/22:** we discover the call “[Hop On Facility \(HORIZON-WIDERA-2022-ACCESS-07\)](#)”
 - inclusion pathway for countries with low R&I performance
 - enabling widening countries to join selected consortia
 - extend or improve ongoing projects with additional key expertise and activities
 - 470 k€ max budget
 - 8 pages max for the technical proposal (wow!)
 - submission deadline: **10/11/22** (!!!!!)



we decided to go full immersion

- ✓ **same day:** found a compatible R&I project named “COCHISA”
- ✓ **same day:** contacted the project coordinator → got an answer in less than 1 hr!
- ✓ **next day:** web meeting with the coordinator to explain the idea → he was super happy!
- ✓ **couple of day after:** the Consortium internally approved our potential participation
- ✓ COCHISA-EXT project proposal was submitted on **08/11/22** → **approved on 15/03/23**

COCHISA PROJECT OVERVIEW (original)

COCHISA → European Core-Chip for Space Applications

- Design, development and testing of beamformers core-chips in X and Ka bands (2 runs)
- For X Band core-chip only:
 - QFN package assembly
 - Irradiation campaign (TID and SEE)
 - Development and manufacturing of a demonstrator
 - Reliability tests
- (non technical) Management and dissemination activities

ORIGINAL OBJECTIVE:
reach TRL 7 for X Band core-chip and TRL 5 for Ka Band core-chip

(in 3 years)



we proposed to extend the “X Band only” activities to Ka Band core-chip too!

COCHISA PROJECT OVERVIEW (extended)

COCHISA-EXT → COCHISA Extension

- QFN package assembly of the Ka Band core-chip (subcontracted)
- Irradiation campaign (TID and SEE) of the Ka Band core-chip
- Development and manufacturing of a demonstrator of the Ka Band core-chip
- Reliability tests of the Ka Band core-chip

**NEW OBJECTIVE:
reach TRL 7 for the Ka Band core-chip too!**



Proposal approval: 15/03/2023
Contract signature: July 2023

COCHISA PROJECT STATUS

- **X Band core-chip**

- 1st batch not working properly → various issues at design level
- 2nd batch working but with poor performance → issues identified
- 3rd batch in production with various fixes and improvements
- 2nd batch performed irradiation testing anyway
- demonstrator in standby

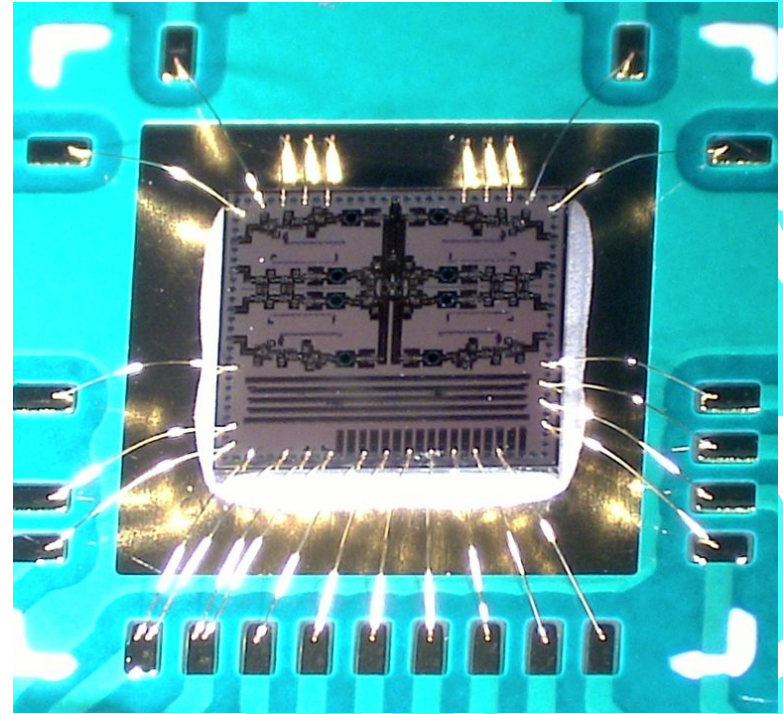
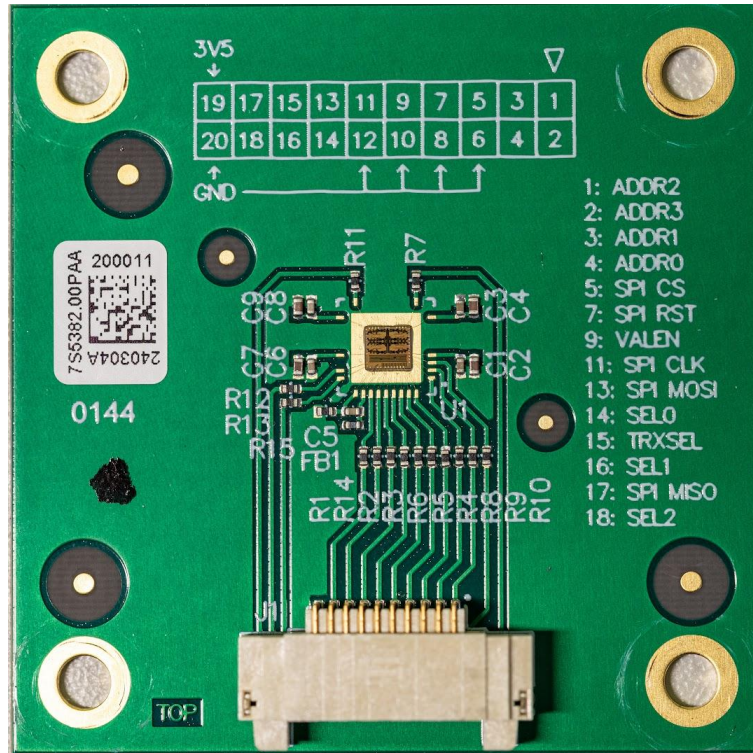
- **Ka Band core-chip**

- 1st batch fully functional and characterized
- 1st batch SEE tested up to 136 MeV*cm²/mg → still fully functional
- QFN package with poor performance → subcontractor change
- demonstrator board completed and tested
- 2nd core-chip batch in production with some improvements
- new QFN package design in progress with better technology



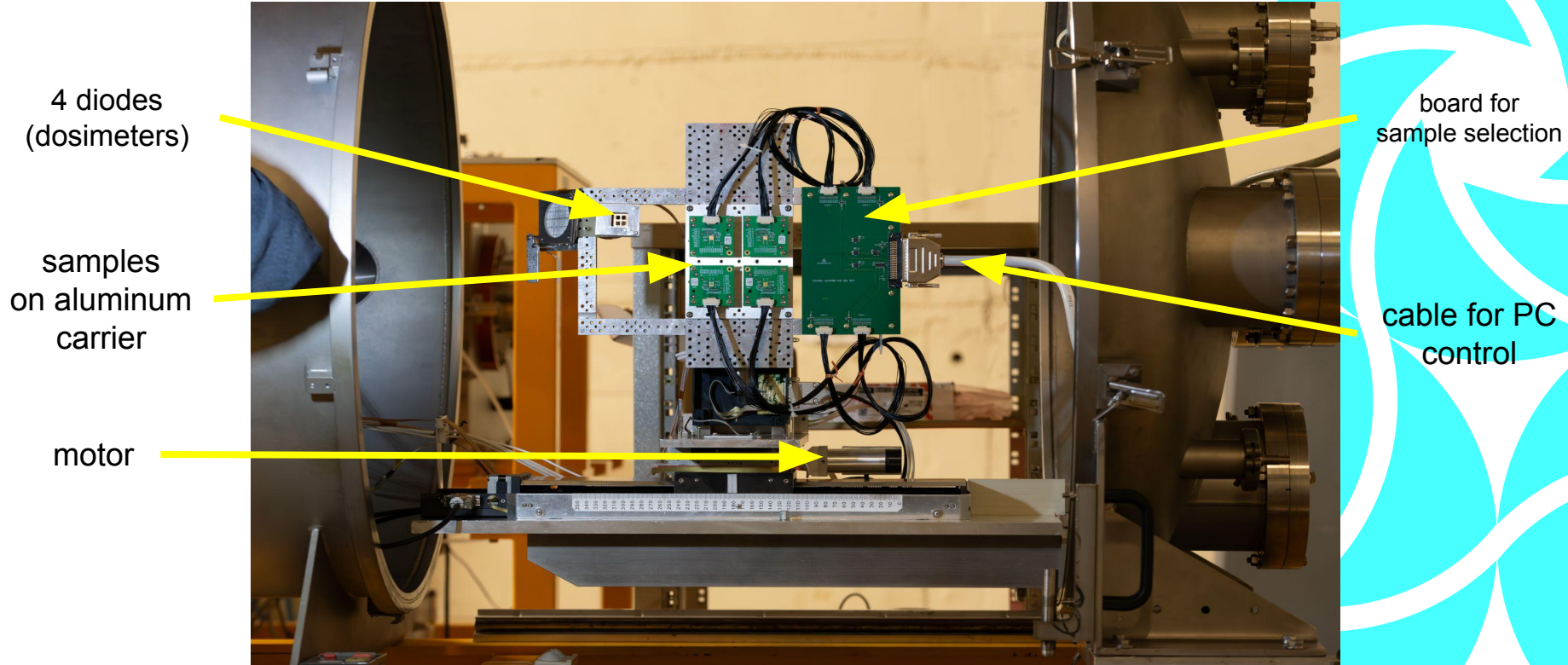
Consortium asked an extension due to X Band core-chip issues → from 31/10/2025 to mid 2026

COCHISA PROJECT STATUS - PHOTOS #1



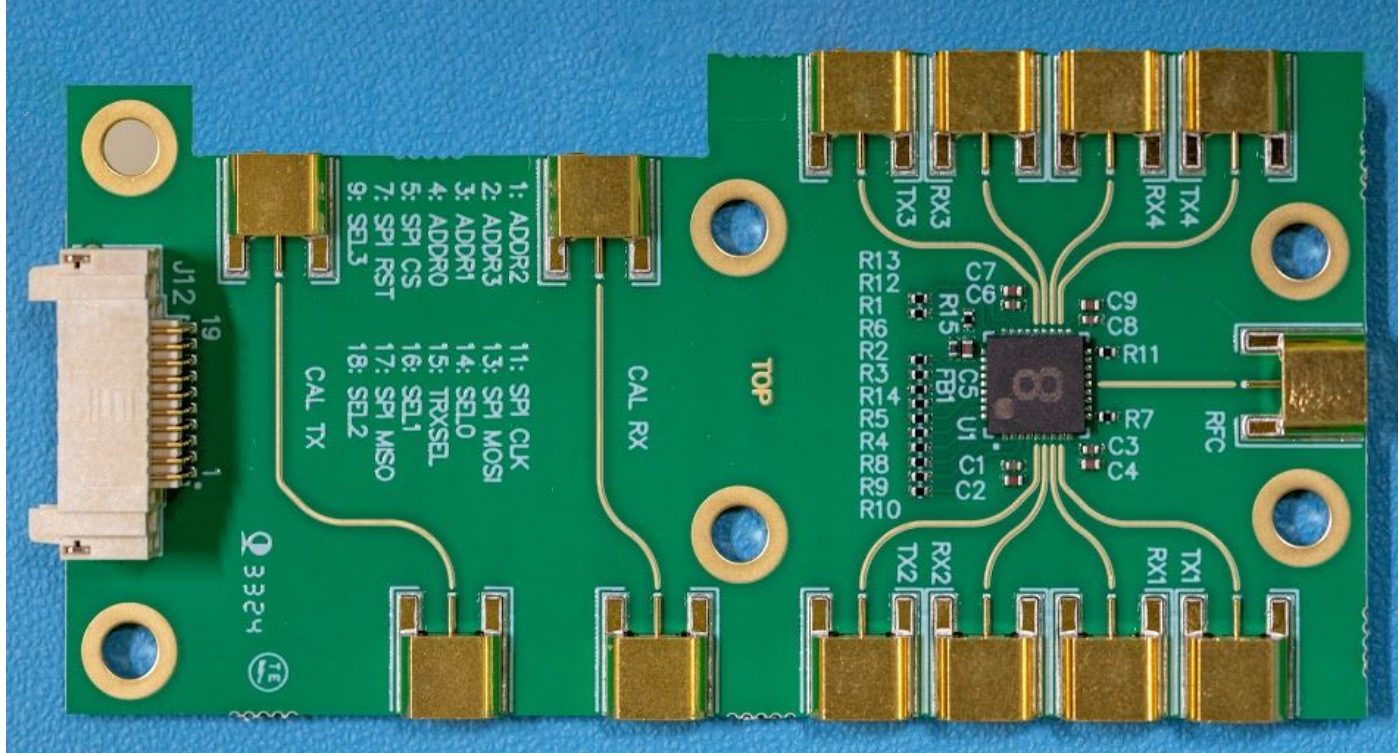
Ka Band core chip on a PCB carrier for testing

COCHISA PROJECT STATUS - PHOTOS #2



Single Event irradiation test with heavy ions

COCHISA PROJECT STATUS - PHOTOS #3



QFN packaged Ka Band core chip on the demonstrator board

LESSONS LEARNED

- **Proposal**

- insights from a winning proposal → style, key points, important parts
- our proposal evaluation/feedback → fundamental to improve

- **Bureaucracy**

- full registration to EU portal with roles and responsibilities → do not underestimate

- **Project Management**

- synchronization between coordinator and you → communication is the key
- communication with many partners with (very) different company sizes → your processes are not their processes
- subcontractor → select your subcontractor with extreme care and make a contract

- **Financial Reporting**

- keep track of working hours for each activity in detail → be aware of external audits
- keep track of all expenses (invoices, receipts, travels, etc.) → be aware of external audits
- organize costs with same categories as the proposal → save a lot of time during reports

TIPS AS PROPOSAL EVALUATOR (& WRITER)

- **Style**

- Clear and simple definitions, descriptions and proposal structure
 - be technical, but not overly technical like a scientific paper or an ESA proposal
 - block diagrams, photos (especially to justify your experience in the topic), tables are super OK
 - color codes are appreciated
- Don't use AI to generate stuff
 - it's the fastest way to get a low score
 - use AI to compress sections or improve readability (especially for non-native english)

- **Objectives**

- shall be aligned with the scope of the call
- 4-6 clear objectives clearly stated in bold
 - if your 6 years old nephew understand it, it's clear
 - best if measurable (e.g. Technology Readiness Level)
 - best if one is related to EU pillars (e.g. non-dependence, etc.)
 - best if one includes commercialization or real need/use case

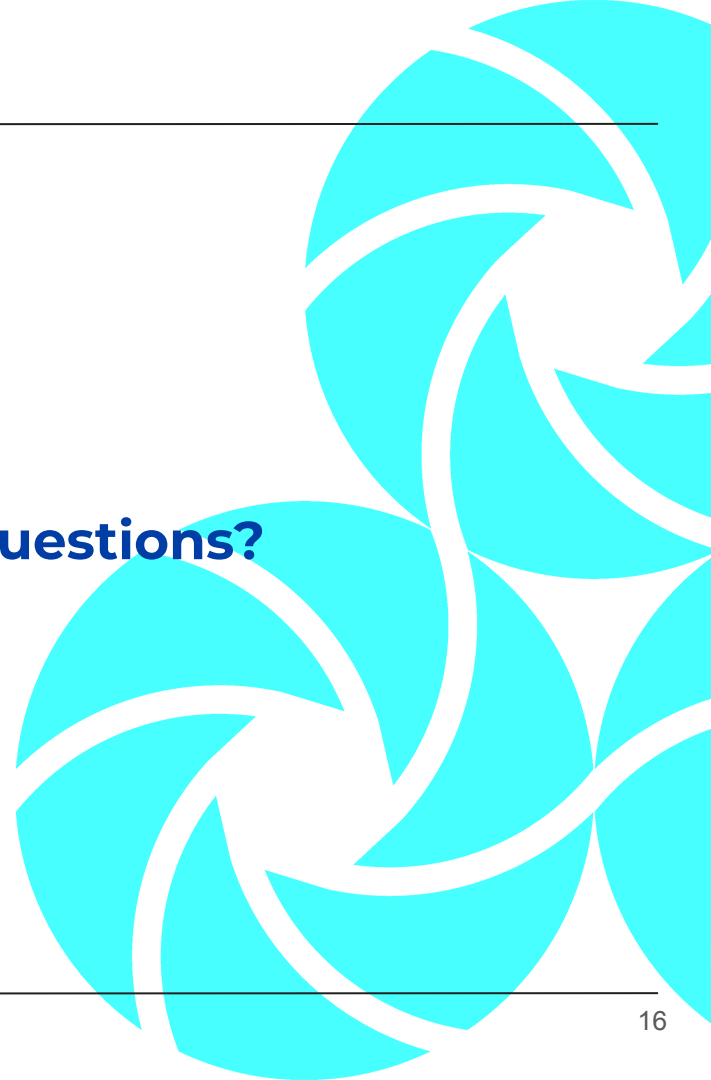
- **Implementation**

- have a clear GANTT, work logic and work breakdown structure
 - each partner has to be essential in the project
 - best to include an experienced EU space stakeholder (e.g. TAS, Airbus, OHB, etc.)
 - justify your effort and expenses
- have a clear business case or commercialization plan

Q & A



Any questions?



THANK YOU FOR YOUR ATTENTION

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