

Quarterly Administrative Report

1. Program and Project information	
Name of the Program:	IDEAS - Engineering and Technological Sciences
Name of the Project:	Hybrid Integrated Satellite and Terrestrial Access Network
The Project acronym:	hi-STAR
Project realization period (from dd/mm/yyyy to dd/mm/yyyy):	Start date:01/04/2024 - End date:30/06/2024
Reporting period (insert Q1, Q2, Q3, Q4, ..., Q8):	Q10

2. Project participants information	
2.1. Principal Investigator (PI) and Lead Science and Research Organization (SRO)	
Name and last name of the PI:	Predrag Ivaniš
Academic and research title of the PI:	Full professor
SRO name:	School of Electrical Engineering, University of Belgrade (SEE)
SRO authorized person (legal representative) name and last name:	dr. Dejan Gvozdić

2.2.* Project Partners - Science and Research Organizations (SRO)	
SRO name:	Faculty of Electronic Engineering, University of Niš (FEE-UNI)
SRO authorized person (legal representative) name and last name:	Prof. dr Dragan Mančić, dean
SRO name:	Innovation Center, School of Electrical Engineering, University of Belgrade (ICEF)
SRO authorized person (legal representative) name and last name:	Ilija Radovanović, vice director

*Copy this table as needed to provide information about all Partner SROs.

2.3. Members of the project team		
Name, last name	Academic and research title*	Science and Research Organization (SRO) Acronym
PI: Predrag Ivaniš	Full professor	SEE
P1: Goran Đorđević	Full professor	FEE-UNI
P2: Lazar Saranovac	Full professor	SEE
P3: Zoran Čiča	Full professor	SEE
P4: Dejan Drajić	Senior research associate	ICEF
P5: Srđan Brkić	Assistant professor	SEE
P6: Dragomir El Mezeni	Assistant professor	SEE
P7: Vesna Blagojević	Associate professor	SEE

P8: Vladimir Petrović	Assistant professor	SEE
P9: Haris Turkmanović	Teaching assistant	SEE
P10: Đorđe Sarač	Junior research assistant	SEE
P11: Ivan Vajs	Research assistant	ICEF
P12: Goran Marković	Associate professor	SEE

*In case of any changes in the status of academic and research titles of team members, submit the appropriate decision on acquiring academic and research title of the team member(s) in question, justifying the change of the status.

2.4. Project team performance
Are the project team members performing their roles and tasks in line with the approved Project Proposal (as presented in the Project Description A, Gantt Chart, Budget and other project documentation)? Is the cooperation between team members adequate? If NO, elaborate.
<p>Project team members perform roles and tasks fully per the approved Project Proposal. The cooperation between team members is adequate, and the obtained results represent a good starting point for the synergy of the project team in the next quarter.</p> <p>In the sixth quarter, our focus was on WP4, WP5, and WP6.</p> <p>In this reporting period, we analyzed handover strategies in land-mobile satellite communications. Furthermore, our research was oriented toward integrating our model into a global framework, to prove its usefulness in practice. Major work was done on the preparation and finishing of Deliverable D5.2 as this was the main task for this period in Subactivity 5.2. Classification of business use cases based on industrial sectors has been done and presented to one telecommunication operator. Different models were analyzed for the channel emulator and a two-step approach will be used. The initial architecture of the channel emulator is proposed.</p> <p>One paper was published in the international journal from the JCR list, in the journal Entropy (published in May 2024). Two project team members presented the project at the Internal workshop forum of Wireless Communication, TU Wien, Vienna, Austria (April 2024). Three project team members presented an online lecture for engineers employed at Telekom Srbija, Belgrade, Serbia (June 2024).</p>
During the reporting period, were there any unforeseen circumstances requiring a change in any of the team members, including the PI? (This includes a change of job or contract of a team member, or a change in the research or academic title, longer-term absence like parental leave, inability to work or any other relevant change.) If YES, elaborate.
<p>P5 - Srđan Brkić is not engaged in the project starting from June 1st. He is not employed at SEE starting from June 1st 2024. The corresponding documentation was already sent by e-mail, and a new version of the application info document, gant chart, budget, and payment schedule was filled and approved by the Science Fund.</p> <p>P12 - Goran Marković is engaged in the project starting from June 1st, as a replacement for Srđan Brkić. His research title is assistant professor. The corresponding documentation was already sent by e-mail, and a new version of the application info document, gant chart, budget, and payment schedule was filled and approved by the Science Fund.</p>

3. Progress on implementation and results achieved

3.1. Milestones - Short description of milestones achieved during the reporting period, with reference to the Project Description and Gantt Chart.			
Milestones title – insert milestone name*	Delivery month (Mx) from Gantt Chart	Milestone reached	If not reached, enter estimated month (Mx)

*Based on milestones planned in Table 3.2d in the Project Description A (Approved Project Proposal - Project Description, in accordance with the Decision of the Managing Board) and Gantt Chart (Annex 3 of the Contract on the Project financing).

3.2. If a milestone is not reached, please explain – based on milestones planned in Table 3.2d in the Project Description A (Approved Project Proposal - Project Description, in accordance with the Decision of the Managing Board) and Gantt Chart (Annex 3 of the Contract on the Project financing). If a milestone is reached, enter N/A.
N/A. No milestones are planned in the tenth quarter.

3.3. Deliverables - Short description of deliverables achieved during the reporting period, with reference to the Project Description A and Gantt Chart.				
Tasks/activities*	Deliverable name**	Delivery month (Mx) from Gantt Chart	Achieved Deliverable	If not achieved, enter estimated delivery month (Mx)
1 WP5, Subactivity 5.2	D5.2 Edge control center for optimal user traffic distribution	M30	Yes	
2 WP5, Subactivity 6.1	D6.1 Channel emulator for 5G/satcom signals	M30	No	M33
3 WP1	D 1.3 - Quarterly progress reports	M30	Yes	

*Based on tasks presented in Table 3.2c in the Project Description A (Approved Project Proposal - Project Description, in accordance with the Decision of the Managing Board) and Gantt Chart (Annex 3 of the Contract on the Project financing).

**Based on deliverables presented in Table 3.2c in the Project Description A (Approved Project Proposal - Project Description, in accordance with the Decision of the Managing Board) and Gantt Chart (Annex 3 of the Contract on the Project financing).

3.4. If a deliverable is not reached, please explain – based on deliverables presented in Table 3.2c in the Project Description A (Approved Project Proposal - Project Description, in accordance with the Decision of the Managing Board) and Gantt Chart (Annex 3 of the Contract on the Project financing). If a deliverable is reached, enter N/A.
D6.1: The initial architecture of the channel emulator is proposed. but the final parameters, such as the length of the filter, which is necessary for implementation, have not yet been determined.

3.5. Project results (recommended up to 250 words) – brief summary of the Project progress (briefly describe performed project tasks, activities and results relevant for the current reporting period).
The project progresses as scheduled.

In Q10, WP1, WP4, WP5, WP6, and WP7 were active.

WP1 - Subactivity 1.1: The ninth quarterly progress report was submitted, the signed documents were uploaded, and the hard copy of the report was sent to the Science Fund. Documentation related to the replacement of the project team member (P12 instead of P5), including a new version of the application info document and gant chart, was filled and approved by the Science Fund.

The reports were accepted, and the administrative part of the report was published on the project website. The modified budget was approved, the signed documents were uploaded, and the hard copy of the report was sent to the Science Fund.

WP4 - Subactivity 4.3: In this reporting period, we analyzed handover strategies in land-mobile satellite communications. Furthermore, our research was oriented toward integrating our model into a global framework, to prove its usefulness in practice. In the next three months, we plan to finish and submit the corresponding journal paper.

WP5 - Subactivity 5.2: Major work was done on the preparation and finishing of Deliverable D5.2 as this was the main task for this period in Subactivity 5.2.

WP5 - Subactivity 5.3: Classification of business use cases based on industrial sectors has been done and presented to one telecommunication operator.

WP6 - Subactivity 6.1: Different models were analyzed for the channel emulator and a two-step approach will be used. The initial architecture of the channel emulator is proposed.

WP7 – Subactivity 7.1: The project website is regularly updated. Website, google analytics, and social networks KPIs are monitored regularly.

WP7 – Subactivity 7.2: One paper is published in the international journal from the JCR list, in the journal Entropy (published in May 2024). Two project team members presented the project at the Internal workshop forum of Wireless Communication, TU Wien, Vienna, Austria (April 2024). Three project team members presented an online lecture for engineers employed at Telekom Srbija, Belgrade, Serbia (June 2024).

WP7 - Subactivity 7.3: Initial activities for the preparation of the workshop have started, and we plan to organize the project workshop in October or November 2024.

3.6. Project deviations (recommended up to 250 words) – In case of any deviation/discrepancy from the Project Description A, briefly describe reasons for its occurrence and appropriate further steps. In case of no deviations/discrepancies, enter N/A.

Project activities have been executed fully according to the Project proposal (Annex 1 of the Contract on the Project financing).

Personnel costs for all researchers for M30 will be paid in the first half of July 2024, according to a general payment schedule. Additionally, the personnel costs for researchers engaged in ICEF for M29 will be paid in the first half of July 2024.

3.7. Project risks

3.7.1.a. Foreseen risks - the risks identified in Table 3.3 in the Project Description A – for the current reporting period.

Risk No.	Risk title	Description of risk	Work Packages/Tasks concerned	Risk-mitigation measures (as in Project Description A)
1	Members of the project team and SROs - Project team member leaves the Project	Project team member P5 (also the coordinator of WP4) leaves the Project	WP4, WP5	Reorganize the assignments to cover the missing member - this can lead to delay in completion of some subactivities.

3.7.1.b. Status of risk mitigation measures				
Risk No.	Risk Title	Did the risk occur?	Did you apply risk mitigation measures?	If the risk still applies, describe the next steps for risk mitigation.
1	Members of the project team and SROs - Project team member leaves the Project	Yes	Yes	No. We have found the adequate replacement for the team member P5, and PI is now also the coordinator of WP4..

3.7.2.a. Unforeseen Risks - describe all the additional risks that were NOT initially identified in Table 3.3 in the Project Description A.				
Risk No.	Risk title	Description of risk	Work Packages/Tasks concerned	Proposed risk-mitigation measures

3.7.1.b. Status of risk mitigation measures (for unforeseen risks)				
Risk No.	Risk Title	Did the risk occur?	Did you apply risk mitigation measures?	If the risk still applies, describe the next steps for risk mitigation.

3.8. Publishable summary* – description (up to 250 words) of the activities and significant results achieved by the project in the reporting period in both English and Serbian.
English (up to 250 words)
In this reporting period, we analyzed handover strategies in land-mobile satellite communications. The major activity was work on the completion of D5.2 deliverable for subactivity 5.2. Also, work on D5.3 was continued where industrial sectors-based classification of HUT business use cases has been done. Different models were analyzed for the channel emulator and a two-step approach will be used. The initial architecture of the channel emulator is proposed. The website of the project https://hi-star.etf.bg.ac.rs/ is updated. Website google analytics and social networks KPIs are followed regularly. One paper is published in the international journal from the JCR list, in the journal Entropy. Two project team members presented the project at the Internal workshop forum of Wireless Communication, TU Wien, Vienna, Austria (April 2024). Three project team members presented an online lecture for engineers employed at Telekom Srbija, Belgrade, Serbia (June 2024).
Serbian (up to 250 words)
U ovom kvartalu, detaljno su analizirane strategije hendovera u satelitskim telekomunikacionim sistemima sa mobilnim zemaljkim korisnikom. Glavna aktivnost je bila rad na kompletiranju izveštaja D5.2 u okviru podaktivnosti 5.2. Pored toga nastavljen je i rad na izveštaju D5.3 u okviru čega je urađena klasifikacija mogućih poslovnih primena HUT uređaja za različite industrijske grane. Web sajt projekta https://hi-star.etf.bg.ac.rs/ se redovno ažurira, a KPIevi Google analitike veb-sajta i društvenih mreža se redovno prate. Jedan rad je objavljen u međunarodnom časopisu Entropy, koji je indeksiran na JCR listi. Dva člana projektnog tima predstavila su projekat na internoj naučnoj radionici posvećenoj bežičnim telekomunikacijama, koja je organizovana na TU Wien u Beču u aprilu 2024. godine. Tri člana projektnog tima održala su onlajn lekcije inženjerima zaposlenim u vodećem telekomunikacionom operatoru, Telekom Srbija u Beogradu, Srbija, u junu 2024. godine.

*This summary should clearly explain the key features of the Project to a non-scientific audience. The Publishable summary for the current reporting period should not consist of more than 250 words. It should focus on achievements to date and how these will generate impact. The Publishable summary can be used by the Science Fund of the Republic of Serbia for promoting and demonstrating the value and impact of the Project.

4. Dissemination*
4.1. Scientific publications – Insert the full reference with the link of the publication: article in journal, publication in conference/workshop, book/monograph, book chapter etc.
<p>One journal paper is published in the international journal from the JCR list: [1] P. Ivaniš, J. Milojković, V. Blagojević, and S. Brkić. "Capacity Analysis of Hybrid Satellite–Terrestrial Systems with Selection Relaying" Entropy 26, no. 5: paper number 419, May 2024. (type of scientific publication: article in journal; journal ranking: M22; publication status: published; Open Access: yes; web: https://www.mdpi.com/1099-4300/26/5/419, DOI: https://doi.org/10.3390/e26050419, impact factor: 2.1).</p>

*Please keep in mind that only activities that are properly labelled according to promotion, publicity and visibility rules as stated in the Contract of the Project financing will be accepted as Project results. As additional documentation, please submit a copy of the main pages of all publications.

4.2. Type of dissemination and communication activities*
<p>During Q10 one paper was published in an international journal indexed in JCR list. Two project team members presented the project at the Internal workshop forum of Wireless Communication, TU Wien, Vienna, Austria (April 2024). Three project team members presented an online lecture for engineers employed at Telekom Srbija, Belgrade, Serbia (June 2024).</p>

*List only activities directly linked to the Project like organization of a conference, workshop, press release, website, social media, training etc. Provide the website/social media link for this reporting period. As additional documentation, please submit visibility activities supporting documentation (e.g. workshop materials, pictures, promotion materials etc.).

5. Ethical approvals (if applicable)					
No.	Ethical approval*	Period covered by the ethical approval	Issuing authority	State which SRO is covered by the ethical approval	State which work package/task is covered by the ethical approval

*List all documentation (approvals, decisions etc.) required by relevant laws.

5.1. If the ethical approval has not been obtained, please elaborate.

6.1 Environment - Please indicate if your research involves use of potentially hazardous or harmful elements for the environment (such as chemicals, polluting substances etc.). In case your answer is yes, please elaborate how do you ensure environment protection in compliance with the official standards in Serbia. Please list official protocols or permissions obtained by the public authorities you follow, if any.

6.2 Health and Safety - Please indicate if your research involves activities potentially hazardous for the workers' health (e.g. field work in dangerous terrain, laboratory work etc.). In case your answer is yes, please elaborate safety measures you undertake prior to, and during those activities in compliance with the official standards in Serbia. Please list official protocols you follow, if any.

7. Additional information relevant for Project implementation (if needed)

8. Date and signature

We hereby confirm that all information in the Quarterly Administrative Report is accurate.

Name and last name of the authorized person

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|----------------------------------|--------------------|
| 1. _____ | <u>09.07.2024.</u> |
| Leading SRO (stamp) | date |
| dr. Dejan Gvozdić | |
| 2. _____ | <u>09.07.2024.</u> |
| Project PI | date |
| Predrag Ivaniš | |
| 3. _____ | <u>09.07.2024.</u> |
| SRO 1 (stamp) | date |
| Prof. dr Dragan Mančić, dean | |
| 4. _____ | <u>09.07.2024.</u> |
| SRO 2 (stamp) | date |
| Ilija Radovanović, vice director | |