

Note: This is an initial description of potential activity for the benefit of the Region of Eastern Macedonia and Thrace, in response to RIS3.

Title: Incorporation of Regional Strategies within the Objectives of Space Internetworking Center

A proposal from V. Tsaoussidis, Professor of ECE, DUTH and the SPICE team, [1].

Introduction: Space Internetworking Center (SPICE) is a unique Center of Excellence in Europe, located in Xanthi, Greece, within the premises of Electrical and Computer Engineering. SPICE exploited its research contribution in standardization bodies internationally and achieved significant reputation, worldwide. It is officially recognized as a European Center of Excellence, [2]. SPICE was funded entirely by FP-7 REGPOT, FP-7 SPACE, and European Space Agency and collaborated with NASA, ESA, MIT and University of Cambridge, along with well-known industries, worldwide, [3].

Goals and Objectives: SPICE incorporates Space and Internet technologies for their mutual benefit: Space benefits from internet technologies and the Internet benefits from Space communications, [4,5,6,7]. That is, statistical multiplexing allows for cost-effective and reliable communications but also Space links allow for Global internetworking, or internetworking on demand. Space Internetworking allows for significant extension of internetworking capabilities especially in Regions with isolated areas that are, communication-wise, under-exploited. The intention of the present proposal is to emphasize on applications for the benefit of the Region of Eastern Macedonia and Thrace. This will be realized in the following directions:

1. Maintain its capabilities and **expand its services worldwide**, enhancing the competitiveness of the Region in attracting external funds. SPICE has demonstrated its excellence in attracting European Competitive funds.
2. Expand its services to **focus on** region-crucial applications and in particular in **environmental monitoring and protection**. This activity spans across a variety of objectives: from environmental sensor internetworking through to forest monitoring, product footprint characterization and ecological modeling of regional products and surface. Satellite and UAV imagery can also be leveraged to support smart agriculture.
3. Expand its services **to form a responsive unit for emergency situations** through deployment of on-demand communication capabilities in isolated regions or on demand monitoring of border activity or operational but also touristic activities in isolated mountains, rivers or forests.
4. Leverage its liaison with regional and international partners to develop applications in the context of smart cities.
5. Expand its services to **exploit the potential of regional industrial collaboration**, possibly leading to joint patents, royalties or European proposals.

In particular, positive impact is expected on **rural life** (will guarantee permanent research evolution in the field of emergency response, smart agriculture, environment), **urban life** (smart cities infrastructure), **environment** (protection, product footprint, ecological modeling), and certainly the **region in general** (boost of the social and economical status of a poor region like Thrace, support regional technology firms, bring region to the forefront of smart communications).

This new angle of regionally-focused activities and directions requires support for satellite services, application development, environmental technology transfer

and administrative services. Note that the environmental engineering department of DUTH includes recognized experts already, [8]. The return of such regional investment will be significant: The aforementioned activities implement important civil services, strengthen the region's competitiveness in attracting external funds, boost the marketing capacity of local quality products and enhance the reliability of regional services to local civilians and visitors. Furthermore, boosts the reputation of the Region and the collaborative potential of local industries in the area of internetworking and communications.

References:

- [1] <http://www.spice-center.org/members/>
- [2] http://www.eydamth.gr/lib/articles/newsite/ArticleID_588/Prosf_gnosis-V4.pdf (p.27)
- [3] <http://www.spice-center.org/>
- [4] S.-A. Lenas and V. Tsaoussidis, "[Enabling free internet access at the edges of broadband connections: a hybrid packet scheduling approach](#)", SIGMOBILE Mobile Computing and Communications Review (MC2R), Vol. 18, Issue 1, pp.55-63, Feb. 2014. doi: 10.1145/2581555.2581564
- [5] G. Papastergiou, I. Alexiadis, S. Burleigh and V. Tsaoussidis, "[Delay Tolerant Payload Conditioning Protocol](#)", Elsevier Computer Networks, vol. 59, pp.244-263, February 2014, doi: 10.1016/j.bjp.2013.11.003
- [6] I. Komnios, I. Alexiadis, N. Bezirgiannidis, S. Diamantopoulos, S.-A. Lenas, G. Papastergiou and V. Tsaoussidis, "SPICE Testbed: A DTN Testbed for Satellite and Space Communications", 9th International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TRIDENTCOM 2014), Guangzhou, China, May 5-7, 2014, to appear.
- [7] N. Bezirgiannidis, S. Burleigh, and V. Tsaoussidis, "[Delivery Time Estimation for Space Bundles](#)", vol.49, no.3, pp.1897,1910, July 2013, doi: 10.1109/TAES.2013.
- [8] <http://www.airpollab.org/>