SPICE
SPACE INTERNETWORKING CENTER

SPICE update

A tri-annual newsletter

October 2010

Volume 1 Issue 1

In this issue

Summary

Scope of SPICE is to lead research community towards the most promising directions of research and development in the area of Space Internetworking and Delay Tolerant Networking, in general. SPICE will incorporate scientific activities of Internetworked Systems (InterSys) Laboratory of the Department of Electrical and Computer Engineering of Democritus University of Thrace, Greece, other relevant research Laboratories, faculty members worldwide and several research engineers under a state-of-the-art European Center for Space Internetworking.

CAPACITIES

Space Internetworking Center (SPICE) is funded by "Capacities" of the Seventh Framework programme. The project is approved as a "Coordination and Support Action" under the "Research Potential" scheme (Grant Agreement Number 264226).

WELCOME TO SPICE UPDATE

Project Coordinator

Prof. Vassilis Tsaoussidis

It is my pleasure to present the first official newsletter of SPICE, the Space Internetworking Center, which was established in September at the Democritus University of Xanthi, Greece. The Center is supported by the FP7 Capacities Program, one of the most competitive programs of FP-7 for all scientific fields. FP-7 Capacities expects significant impact for the scientific objectives of the project but also for the region itself. In our case, we intend to promote the field of Space Internetworking and bind it with its peripheral fields, such as security and privacy, information processing storage and retrieval, parallel processing, space communications and delay/disruptive-tolerant communications.

SPICE has already established a collaboration framework with top European schools, such as University of Cambridge, Tampere University, University of Helsinki, and University of Zurich. Thanks to our colleagues, Ioannis Komnios and Agapi Papakonstantinou, SPICE has already established a challenging agenda which includes panel discussions, workshops, research staff exchange, weekly lecture series but also has highlighted research priorities such as Deep Space Internetworking, security and DTN, Internetworking and Delay Tolerant Networking, and Energy-saving protocols, among others. Within the scope of our project, we also intend to upgrade our ESA/ESOC-funded DTN Testbed, the first European DTN Testbed for Space Protocols.

In our newsletter, we intend to host both scientific and informative topics and, along these lines, we will host interviews from Professors and industrial leaders worldwide as well as interviews from experts in the European Union and FP7. We start, in this issue with Georgia Tzenou, National Contact Point for FP7 REGPOT.

Enjoy SPICE UPDATE!

Professor Vassilis Tsaoussidis

SPICE Project Coordinator

SPICE WORK PACKAGES

Work Package 1:

Project Management

Work Package 1 (WP1), corresponds to the management structure of the project, in accordance with the management plan. Due to its nature, WP1 spans from the start until the end of the project.

The main objectives of this work package are:

- to ensure focus on the direction of the project's objectives in accordance with the project plan,
- to guarantee the non-technical, technical and administrative coordination among all activities involved in the project and
- to monitor milestones and ongoing tasks, as well as coordinate the production of reports and deliverables.

Work Package 2:

Exchange of know-how and recruitment of researchers and administrative staff

The overall goal of Work Package 2 (WP2) is to further advance space internetworking and the dissemination of space data. This goal will be achieved through:

- the recruitment of top qualified researchers on the field,

- exchange of know-how with other cooperating research laboratories and institutes through the mobility of human resources,

- the establishment of distinguished speakers series and

- the establishment of a colloquium on a weekly basis.

Work Package 3:

Infrastructure update and state-of-the-art DTN testbed

Work Package 3 (WP3) includes the necessary actions to upgrade the existing infrastructure of Space Internetworking Center laboratory.

The current laboratory infrastructure includes a DTN testbed, able to emulate both satellite and deep-space communication scenarios. During WP3 the testbed will be integrated with more DTN nodes, as well as specialized software, that will allow the conduction of accurate experiments.

Aim of the third work package is the development of a state-of-the-art DTN testbed in a dedicated lab.

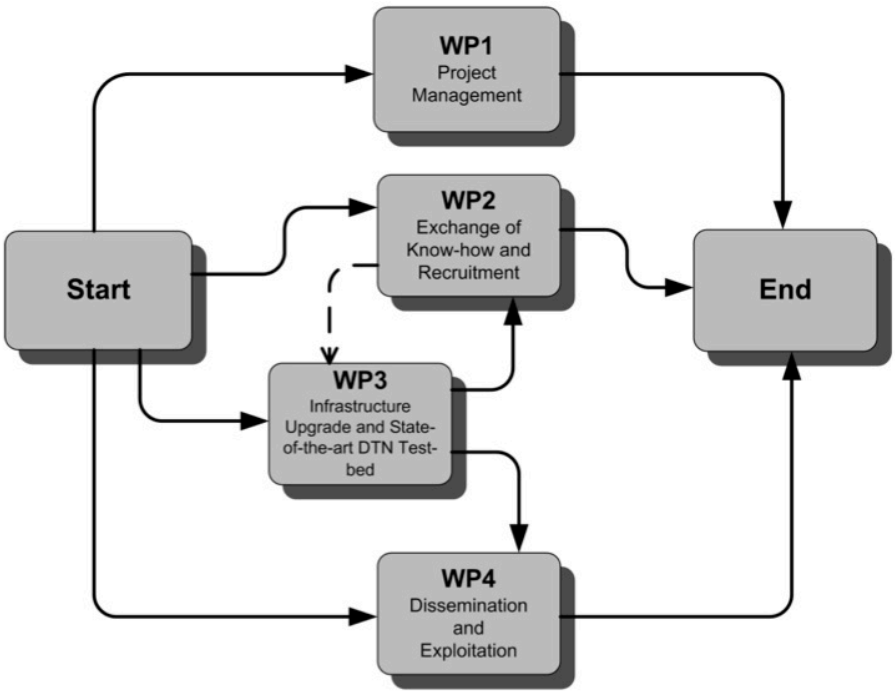
Work Package (WP4) follows an extensive and detailed dissemination and exploitation plan

Work Package 4:

Exploitation and dissemination

This Work Package (WP4) follows an extensive and detailed dissemination and exploitation plan, which will take effect from the beginning of the project. Several actions have been scheduled throughout the duration of the project. In particular, WP4 includes the following activities:

- publication of research results to scientific journals and conferences,
- presentations of our activities to other research institutes,
- active participation of group members in standardisation bodies, such as the Consultative Committee for Space Data Systems,
- organisation of one panel session and two workshops on Delay Tolerant Networking and other promising networking technologies and
- organization of special issues on scientific journals and magazines.



SPICE Partners

SPICE will integrate the expertise of several partners and collaborators and exploit the valuable experience of an External Advisory Board composed of experts from EU and US.

The maps below show the location of partners and collaborators.

→ **Partners**
→ **Collaborators**

This alliance will allow for serious contribution with significant impact on future space communications internetworking.

Steering Committee

The ultimate project authority, with collective responsibility for the project as a whole and for long- term strategic decisions within the project, is the **Steering Committee**. The Steering Committee (SC) is chaired by Prof. Tsaoussidis and consists of 5 members; Prof. Efraimidis, Prof. Karakos, Prof. Katos and Prof. Mpekakos. All members have long experience in managing national and European projects and expertise on the research objectives of the project. Their role is to constantly follow how the project is evolving and set guidelines on the research directions of the team.

External Advisory Board

The **External Advisory Board (EAB)** is an entity that follows the scientific activities of the project, comments on potential new direction and proposes new avenues to exploit Space Internetworking. The members of EAB are both distinguished scientists in areas covered by the project and representatives from national and local authorities.

MEMBERS OF THE EXTERNAL ADVISORY BOARD	AFFILIATION
Nestor Peccia	ESA/ESOC
Prof. Torsten Braun	University of Bern
Dr Scott Burleigh	NASA Jet Propulsion Laboratory
Prof. Eytan Modiano	MIT
Antony Crowson	VEGA Deutschland GmbH&Co
Georgia Tzenou	FP7 National Contact Point
Spiros Mavridis	Local Authorities Representative

SPICE PROJECT KICK-OFF MEETING

The kick-off meeting of SPICE project was held on September 2, 2010, in the premises of the Division of Software, Department of Electrical and Computer Engineering, Democritus University of Thrace, Greece.

Professor Tsaoussidis informed the members of the Steering Committee on the managerial procedures of the project and presented the objectives, tasks and deliverables of each work package. The required equipment of the Space Internetworking Center and the corresponding infrastructure upgrade were discussed. Members of the steering committee concluded on a detailed dissemination and exploitation plan, that includes a number of presentations to/from other research institutes, as well as the establishment of a weekly colloquium, open to public. Based on the interests of each laboratory, five research directions that fall within SPICE research agenda were defined. In particular,

- ⇒ *Deep Space Internetworking*
- ⇒ *Space communications security*
- ⇒ *Internetworking and cloud computing*
- ⇒ *Internetworking on Earth*
- ⇒ *Energy saving mechanisms*

Members of the Steering Committee defined a detailed dissemination and exploitation plan, throughout the duration of the project.

SPICE members of the photo (from right to left):
A. Arampatzis, S. Diamantopoulos, V. Katos, S. Lenas, N. Bezirgiannidis, V. Tsaoussidis, A. Karakos, F. Tsapeli, P. Efraimidis, A. Papakonstantinou, I. Komnios

SPICE Members not shown in the photo:
C. Adamidou, S. Dimitriou, G. Drosatos, D. Fillipidis, E. Koutsogiannis, L. Mamatas, M. Mpekakos, G. Papastergiou, A. Petraki, C. Samaras, I. Spiliotis

Democritus University of Thrace

Democritus University of Thrace (DUTH) was established in July 1973 and is the third oldest university in Greece. It was named after the ancient Greek philosopher Democritos who was born in Avdira, Thrace.

The university is organized in two Faculties and eighteen Departments located in four cities of Thrace; that is Xanthi, Komotini, Alexandroupoli and Orestiada. A total of 13.000 undergraduate students are enrolled.

The university plays an important and effective role in establishing the national and cultural significance of Thrace and contributes to the high level of Higher Education in Greece. University funding is provided by the Greek Ministry of Education and several research project, either national or European.

DUTH is ranked among top Greek universities, as far as postgraduate and PhD studies in Greece are concerned. In particular, the Department of Electrical and Computer alone currently employs around 100 PhD candidates, conducting research in several aspects of Electrical Engineering, Electronics, Information Technology, Networking and Communications.

SPICE website is up!

www.spice-center.org

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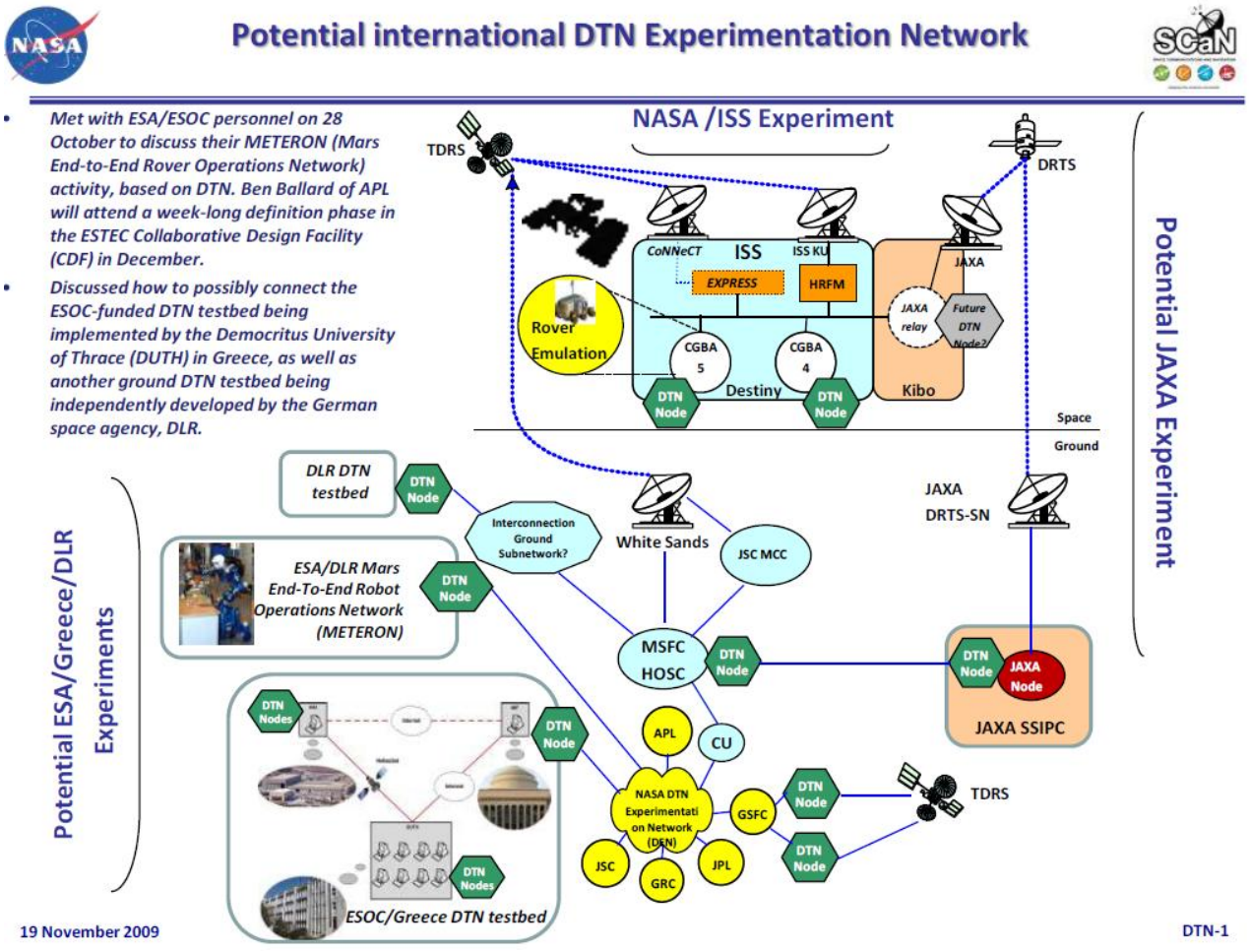
SPICE Scientific Agenda

SPICE scientific agenda currently includes:

- The development and evaluation of Space Data Routers, able to handle different types of space data and dynamically disseminate it to end-users, utilizing policies implemented by Space Agencies **[FP7 SPA.2010.2.1-03]**
- The conduction of high-scale DTN experiments, in collaboration with ESA, NASA and DLR, as shown in the picture below. Scope of these experiments is to interconnect existing DTN testbeds worldwide and uncover possible DTN constraints and capabilities.
- The coordination of the earth portion of the CCSDS experimental Space DTN backbone.
- The implementation of the space communications protocols we have proposed, namely DS-TP and DTTP, into the existing DTN testbed.



ESA/ESOC DTN Testbed

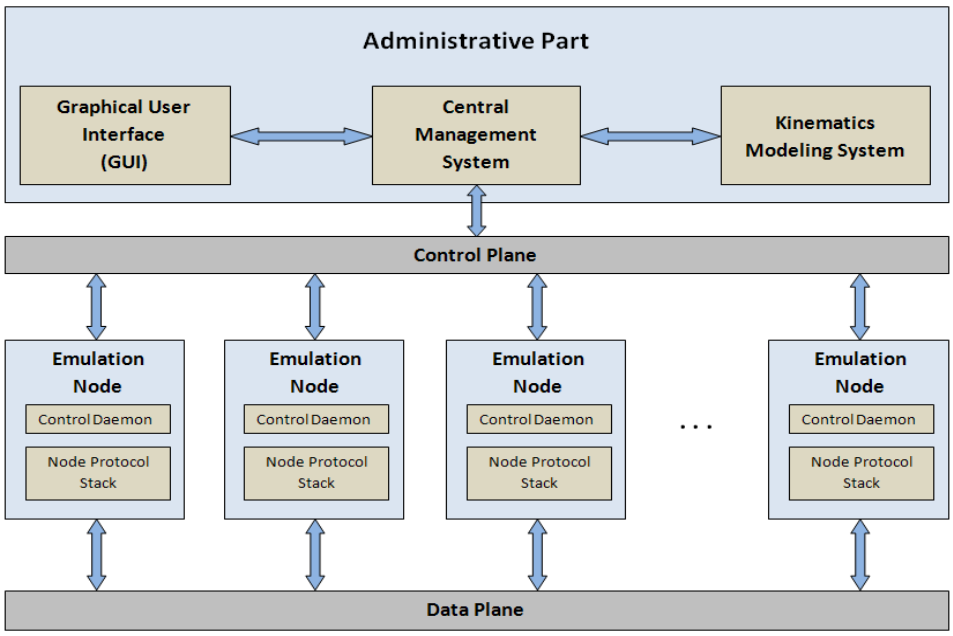
ESA/ESOC DTN Testbed was designed by Internetworked Systems Lab to accurately emulate the properties of current and future deep space communications and focuses mainly on the concept of Delay Tolerant Networking. It includes modeled network links, real and modeled protocol implementations and is enhanced with actual satellite link interfaces offered by Hellas Sat.

Network parameters and evaluation results are controlled through a Graphical User Interface (GUI) application. The testbed allows for realistic emulation of complex scenarios, as far as link characteristics are concerned. That is, emulation scenarios can include:

- planetary surface networks (low error rates and propagation delays),
- near-planet relay networks (higher error rates and propagation delays in the order of seconds),
- Deep-Space low bandwidth backbone networks of long-haul links (high error rates and propagation delays).

The fundamental architecture supported by the testbed is the generic DTN Architecture as defined in RFC 4838. The Bundle Protocol, along with its convergence layers (LTP, UDP and TCP) are used as an overlay and transport protocols respectively, to support communications under challenged conditions. Moreover, several routing protocols, specifically designed for deployment in DTN environments, are used to provide available routes between nodes.

Besides the standard DTN architecture, CCSDS File Delivery Protocol (CFDP) is also integrated to offer application-level functionalities on the testbed. A basic form of CCSDS Space Packet Protocol (SPP) has also been developed and integrated into the testbed to be used as a common layer below DTN-specific protocols.



The picture illustrates the DTN testbed architecture.

The DTN testbed was funded by ESA's "Extending Internet into Space" Project

Career Opportunities

In the framework of SPICE project we invite applications for a team of scientists as follows:

1. Two senior researchers from abroad to work at the Space Internetworking Center (Xanthi, Greece) and be responsible for "the design of application-transport-routing protocols for SPACE and, in general, delay tolerant communications".

Vacancies duration: the term of the appointment will be for one year starting no later than March 2011 with an option for extension.

Job Requirements:

- ⇒ *Computer engineering or computer science degree*
- ⇒ *Ph.D. Degree, preferably in the fields of computer networks or computer architecture or telecommunications*
- ⇒ *Excellent knowledge of English language (speak, read and write fluently).*

Experience in designing space communication protocols or protocols for delay tolerant networks is desirable.

The evaluation of all candidates will be based on their experience, relevance of studies and research accomplishments.

2. Experienced technical personnel for the administration of the Space Internetworking Center.

Job Requirements:

- ⇒ Computer engineering or computer science degree
- ⇒ Knowledge of TCP/IP protocol stack
- ⇒ Experience in designing/implementing internetworked systems.

Salary depends on qualifications. **Maximum gross annual salary** is 40.000€. Accommodation cost in Xanthi is relatively low (for example typical apartment with two bedrooms costs 300€-350€).

Interested applicants should send their curriculum vitae using the Europass standard including:

- An application letter
- A research statement
- A synopsis of research experience
- A list of publications
- The names of three referees

by e-mail to vtsaousi@ee.duth.gr.

Please use the following reference in the subject: **SPICE_RESEARCHERS_2010**. Please note that an acknowledgement e-mail will be sent upon receipt of each application.

Initial deadline for receipt of e-mail: **20/11/2010**

Applications will be accepted until positions are filled.

FP7 REGPOT 2011

Proposal Submission Deadline:

07 December 2010

Unlocking and developing the research potential of research entities established in the EU's Convergence regions and Outermost regions.

The action aims at strengthening the potential of ***research entities established in the Convergence and Outermost regions of the European Union*** (EU) that need new knowledge and support to realise their development. It will help to enhance the capacity of their researchers to successfully participate in research activities at EU level.

The action will therefore tackle a variety of challenges such as 'brain gain' through networking with other European world-class research players and industry, upgrading of relevant RTD infrastructure, recruitment of experienced researchers and institutional mobilization as well as dynamic contribution to the regional or European sustainable socio-economic development.

The 2011 Work Program will cover the following activities:

- ⇒ Exchange of know-how and experience
- ⇒ Recruitment by the selected research entities of experienced researchers
- ⇒ Upgrading, development or acquisition of research equipment
- ⇒ Organisation of workshops and conferences, dissemination and promotional activities

REGPOT-2011: New Call for Proposals

Transnational Cooperation among Research Potential NCPs

By Georgia Tzenou

FP7 Research Potential

National Contact Point (Greece)

The new REGPOT call for proposals "Unlocking and developing the Research Potential of research entities established in the EU's Convergence Regions and Outermost regions" was published on 20 July, with a budget of 64.6 million euro and deadline on 7 December 2010.

The call is addressed at excellent research teams of "significant size" from convergence/outermost regions of Europe. It is a single-proposer call, meaning that each team submits a proposal individually (without consortium) and can claim up to 4 million euro to improve the research equipment, hire new researchers, visit more advanced research organisations in Europe, invite distinguished scientists from abroad, organise and participate to conferences, disseminate research results, etc. The ultimate goal is to enable highest quality research teams from these areas to reinforce their excellence and creativity and to contribute actively to the regional or European economy and social welfare.

REGPOT has been very popular so far. During the period 2007-2010, 1.246 proposals were submitted and 86 were funded with a total of 115.5 million euro. All FP7 thematic domains were represented and there was an excellent geographical spread. The proposals were of very high quality, given that the funded ones scored 14/15 and above.

The National Contact Points for REGPOT (ResPotNet Network, coordinated by the National Documentation Centre (EKT), Greece), actively supports all research teams to benefit from this programme. In the past years, numerous training and mentoring sessions have been organised to improve skills and learn from each other's experiences.

REGPOT-2011: New Call for Proposals

Transnational Cooperation among Research Potential NCPs

By Georgia Tzenou

FP7 Research Potential

National Contact Point (Greece)

Through the Network's website (www.respotnet.eu) you can find answers to the most frequent questions, for example: what is the meaning/evaluation of the "significant size"? What is the difference between research projects and REGPOT "capacity building" programme? What is the average budget requested? How are REGPOT projects linked to Structural Funds? How detailed is the SWOT analysis? How are the partnering organisations reimbursed?

The website also provides information on successful projects, useful presentations, events all over Europe, newsletters, as well as access to a database of excellent research organisations in convergence/outermost regions.

More information and Contact Points all over Europe:
http://www.respotnet.eu/

Frequently Asked Questions:
http://www.respotnet.eu/faq.html

REGPOT: Objectives & Results (EC Officer: M.Kayamanidou)
http://www.ekt.gr/fp7/capacities/REGPOT_MKayamanidou.pdf

REGPOT: lessons learned and possible ways forward (EC Officer: S.Weiers)
http://www.ekt.gr/fp7/capacities/REGPOT_SWieiers.pdf

"The National Contact Points for REGPOT (ResPotNet Network) actively supports all research teams to benefit from this programme."

RELEVANT EVENTS

October 2010

25th – 26th

ANCS – Symposium on Architectures for Networking and Communications Systems

San Diego, USA

25th – 27th

BROADSNET – 7th International ICST Conference on Broadband Communications, Networks and Systems

Athens, Greece

28th – 30th

PDGC – 1st International Conference on Parallel, Distributed and Grid Computing

Solan, India

November 2010

27th – 28th

DBTA – 2nd International Workshop on Database Technology and Applications

Wuhan, China

30th – 3rd December

CoNEXT – 6th International Conference on Emerging Networking Experiments and Technologies

Philadelphia, USA

December 2010

8th – 10th

NAVITEC – 5th ESA Workshop on Satellite Navigation Technologies

Noordwijk, Netherlands

13th – 15th

ICICT – 8th International Conference on Information and Communications Technologies

Cairo, Egypt

15th – 17th

ANTS – IEEE 4th International Symposium on Advanced Networks and Telecommunication Systems

Mumbai, India

WWIC 2011

June 15-17, 2011

Vilanova I la Geltru, Barcelona, Spain

9th International Conference on Wired/Wireless Internet Communications

Important dates

Full paper due:

January 20, 2011

Notification of acceptance:
March 5, 2011

Final version due:

March 30, 2011

Component Events

- Conference Sessions

-5th ERCIM eMobility Workshop

-4th InteliCIS Workshop

Relevant events include major conferences, workshops, and symposiums on Space Technologies, Internetworking, Telecommunications, Parallel Computing and Database Technology.

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