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WORK INSTRUCTION

TRP & GSTP Website Article Template

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TEC-T
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APPROVAL

Title TRP & GSTP Website Article Template	
Issue Number 1	**Revision Number** 1
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CHANGE LOG

Reason for change	Issue Nr.	Revision Number	Date

CHANGE RECORD

Issue Number 1	Revision Number 1		
Reason for change	**Date**	**Pages**	**Paragraph(s)**
Update	14/12/2017	1-5	

DISTRIBUTION

Name/Organisational Unit

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1 INTRODUCTION

The website "shaping the future" was created in 2016 to publish articles on a selection of closed TRP (including ITI and Startiger) & GSTP activities as a contribution to both the dissemination of technology achievements and the Knowledge Management of ESA. The purpose of these articles is to inform a semi-professional audience about the activities.

The structure of the article is oriented on the structure of the Technology Achievement Template (TAT) that needs to be provided for every closed TRP & GSTP activity. The TAT is available on the same website as this document:

http://www.esa.int/Our_Activities/Space_Engineering_Technology/Shaping_the_Future/Download_Area

Although the reuse of the TAT is strongly recommended, the article should provide more information than the TAT – as provided normally during an oral presentation of the TAT.

ESA will then review and publish the article.

2 GUIDELINES FOR ARTICLE PREPARATION

1/ Use the template provided in the annexes 1 to 4 to prepare the website article by replacing all the text in **blue** based on the TAT and enriched with your own summary or that extracted from the TRP or GSTP deliverables provided by the contractor(s) for the specific activity.

2/ **Avoid** the use of **area specific acronyms** that are not known to a semi-professional audience. Moreover, avoid the use of **the future tense**, e.g. "The service will provide the following features…" or "The following tasks will be carried out…". Instead use forms for the text such as "The following tasks are covered by the project activities…".

3/ **Provide a minimum of 2 supporting images:** A reference picture that is representative for the entire activity (e.g., a picture of the manufactured Engineering Model or a generic picture setting the developed component in its technical context) and a further picture that is representative of a highly relevant part of the activity. The pictures need to be in GIF/JPG/JPEG/PNG format (no transparency) as well as of a good size and quality (about 1,000 x 1,000 pixels shall be targeted). The provision of (short) captions is mandatory – 8 to 10 words maximum. If a more detailed description is required, it shall be provided in the dedicated field. The pictures will be published on ESA websites and in print – accessible for the public. If someone shall be credited for these images, further details need to be provided. The **provision of videos** (e.g., via a YouTube link) or further types of media is encouraged.

4/ Once completed, send the article and the images to the Technology Programmes section (tecdms@esa.int) with the Activity Title, Programme reference number, and the contract number in the subject line.

ANNEX 1 – ARTICLE HEADER INFORMATION

Official Activity Title:	Multicore implementation of the On-Board Software Reference Architecture with IMA capability

Programme:	GSTP	Achieved TRL:	XX
Reference:	GSTP G617-010SW	Closure:	2020
Contractor(s):	GMV (PT), Embedded Brains (DE), SSF (FI), TAS-F (FR)		

Contract Number:	4000121551/17/NL/FE			
Further TRL info:	Initial:	XX	Target:	XX
Budget (incl. CCNs):	ESA:	500 k€	Co-funded:	0 k€
Competence Domain:	CD03 Avionic Architecture / DHS / OnBoard S/W / FDIR / GNC / AOCS / TT&C (E2E)			
Technology Domain:	TD02 - Space System Software			
Service Domain:	GEN - Generic Technologies			
Technical Officer: Name, Establishment, and e-mail	Andreas Jung (TEC-SWF) Andreas.Jung@esa.int			
Industry Point of Contact: Name, Establishment, and e-mail	See above.			

ANNEX 2 – ARTICLE

Article	
Background and justification *Max. 75 words*	The works performed by Savoir-Faire, Savoir-IMA and the related industrial activities, including the use of multi-core in embedded systems, have investigated the aspects of each of the technologies on its own. However, it has not been investigated yet the particular impact of a multi-core processor on the On-Board Software Reference Architecture (OSRA), i.e. bringing all technologies together. This will be relevant in particular in the mid-term when those technologies will be used in operational projects.
Objectives *Max. 75 words*	Execute a synthesis about the theory of the relationship between component model, partitioning, SMP operating systems and multi-core. Evolve the OSRA Space Component Model and associated editor, the OSRA toolchain and execution platform to support TSP and multi-core. Demonstrate in a case study on the ESTEC ATB using the updated tools and execution platform. Provide an evaluation of the overall process and tool chain.
Achievements and status *Max. 150 words*	This upgrade was able to push both tools to create and architecture, develop and build an OBSW that can fully support the usage of Time and Space Partitioning (TSP) paradigm at the same time it harness to its maximum the processor usage with multiple cores. The demonstration of the EagleEye use case is the proof of the harnessing in multi-core, the full OBSW is architected in OSRA models. Furthermore TSP OSRA OBSW were demonstrated. The OSRA editor evolved to have the following new features: - OSRA SCM metamodel enriched the Monitoring and Control (M&C) Interface metamodel that permits PUS services and a complete definition of tasks. - Provision of external models for TSP paradigm namely definition of the Partition Kernel and the Partitions themselves - Additional models for Ethernet and 1553. - Upgrade of OSRA-to-TASTE allowing the transformation of OSRA metamodels into tTASTE models, compliant with TSP, multi-core and PUS libraries.
Benefits *Max. 50 words*	The provision of a data package and full documentation guiding and proving that is possible and advantageous to bring OSRA, TASTE, RTEMS and AIR together. Reduction of cost in OBSW development where high level OSRA requirements and TASTE generate automatically high cost software development.
Next steps *Max. 50 words*	- Improve basic OSRA Editor models - Some TSP features are still not modelled e.g. Health Monitor - Solve existing TASTE limitations in TSP and multi-core

	- Upgrade OSRA-to-TASTE. More modular and easily expandable and purposely build to new TASTE architecture. - Small updates following recommendations taken from MORA-TSP process evaluation

ANNEX 3 – PICTURES

Pictures	
Reference Picture	
Picture reference:	Toolchain.png
Short caption:	**MORA-TSP Toolchain**
More detailed description:	Only if necessary. **Max. 25 words.**
Credits:	Only if necessary
Further Picture	
Picture reference:	EagleEye.png
Short caption:	**Subset of modelled EagleEye with OSRA**
More detailed description:	Only if necessary. **Max. 25 words.**
Credits:	Only if necessary

If videos are provided, the template for the mandatory pictures needs to be applied.

ANNEX 4 – RELATED CONTENT

Related Content	
Related links:	Enter below any links related to this project, e.g. links to web pages outside the ESA portal. A short title for the hyperlink needs to be provided.
	OSRA - ONBOARD SOFTWARE REFERENCE ARCHITECTURE web and download page: https://essr.esa.int/project/osra-onboard-software-reference-architecture
	TASTE web and download page: https://taste.tools/
	AIR web page: https://www.gmv.com/en/Products/air/

ANNEX 5 – SUPPORTIVE INFORMATION

Annex 5.1 – ISO Country Codes

Country	ISO Country Code
Austria	AT
Belgium	BE
Canada	CA
Czech Republic	CZ
Denmark	DK
Estonia	EE
Finland	FI
France	FR
Germany	DE
Greece	GR
Hungary	HU
Ireland	IE
Italy	IT
Luxembourg	LU
Netherlands	NL
Norway	NO
Poland	PL
Portugal	PT
Romania	RO
Slovenia	SI
Spain	ES
Sweden	SE
Switzerland	CH
United Kingdom	GB

Annex 5.2 – Competence Domains

CD #	Full name of CD
CD01	EEE / Components / Photonics / MEMS
CD02	Structures / Mechanisms / Materials / Thermal
CD03	Avionic Architecture / DHS / OnBoard S/W / FDIR / GNC / AOCS / TT&C (E2E)
CD04	Electric Architecture / Power & Energy / EMC
CD05	End-to-end RF & Optical Systems and Products for Navigation, Communication & Remote Sensing
CD06	Life / Physical Science Payloads / Life Support / Robotics and Automation
CD07	Propulsion, Space Transportation and Re-entry Vehicles
CD08	Flight Dynamics / Ground stations / mission control
CD09	Digital Engineering for Space Missions
CD10	Astrodynamics / Space Debris / Space Environment

Systems Engineering, tools and PA/QA/Safety are transversal and represented in all Competence Domains.

Annex 5.3 – Technology Domains

TD #	Full name of TD
TD01	On-board Data Systems
TD02	Space System Software
TD03	Spacecraft Power
TD04	Spacecraft Environment & Effects
TD05	Space System Control
TD06	RF Payload Systems
TD07	Electromagnetics Technology
TD08	System Design & Verification
TD09	Mission operation / Ground Data Systems
TD10	Flight Dynamics & GNSS
TD11	Space Debris
TD12	Ground Station Systems / Networks
TD13	Automation / Telepresence / Robotics
TD14	Life / Physical Science
TD15	Mechanisms
TD16	Optics
TD17	Opto-Electronics
TD18	Aerothermodynamics
TD19	Propulsion
TD20	Structures & Pyrotechnics
TD21	Thermal
TD22	ECLS & ISRU
TD23	EEE Components
TD24	Materials & Processes
TD25	Quality, Dependability and Safety
TD26	Other

Annex 5.4 – Service Domains

EO	Earth Observation
SCI	Space Science
EXP	Exploration (former Human Spaceflight and Robotic Exploration)
ST	Space Transportation
TEL	Telecommunication
NAV	Navigation
GEN	Generic Technologies