



**SWITCHING TO INNOVATIVE  
EARNED VALUE ON RESOURCES  
TECHNIQUE TO IMPROVE  
THE FLOW OF PROJECTS  
IN THE DEFENSE INDUSTRY**

**THE NEWLY DEVELOPED EARNED VALUE ON RESOURCES  
IS A MUCH BETTER INDICATOR THAN  
THE EARNED VALUE ON PROJECTS**

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# Introduction

Earned Value Analysis (EVA) metrics have been a staple of project control and reporting for more than half a century.

There is a world of literature on the subject (Vanhoucke 2023). All project and portfolio management software solutions have intricate functionality to report EVA data in a dazzling variety of formats.

**Yet, at EpicFlow we can do better.**

Our main concern is that EVA metrics only tell us that something is wrong when things already have gone south. Project managers take notice of the problem only when the Schedule Performance Index (SPI) and Cost Performance Index (CPI) drop below one. However, the indices do not tell us why they dropped. They don't contain information that can be used to design and execute effective interventions to recover the project.

Why? Because in most cases, the causes are external to the project. Our objective is to identify potential causes of delays and overruns in advance, which would allow us to address these issues proactively before they affect the projects.

**The Earned Value on Resources technique** has been implemented at one of the buyer organizations of JOSCAR UK and some of the supplier organizations of the Dutch defense industry including the Dutch MOD.





## **Paragraph 1.**

# **Research domain, multi-project portfolios**

No man is an island, and no project is alone in a portfolio.

At EpicFlow, we study multi-project environments where many concurrent projects depend on a shared pool of resources (Engwall, M. Jerbrant, A. 2003). This made us aware of two effects that have major repercussions:

There is no such a thing as one delayed task. When you have a task in a project that is ready to run, but can't be initiated because resources are tied up in other projects, you not only delay this project but also tasks in other projects that cause more delays in yet more projects. The effect cascades throughout the portfolio.

Overloading human resources destroys productivity. When we assign people to work on multiple projects simultaneously, we see an immediate productivity drop. When we stretch this even further we see stress, fatigue, frustration, and eventually burnout (Zika-Vitorsson, et.al.2006).



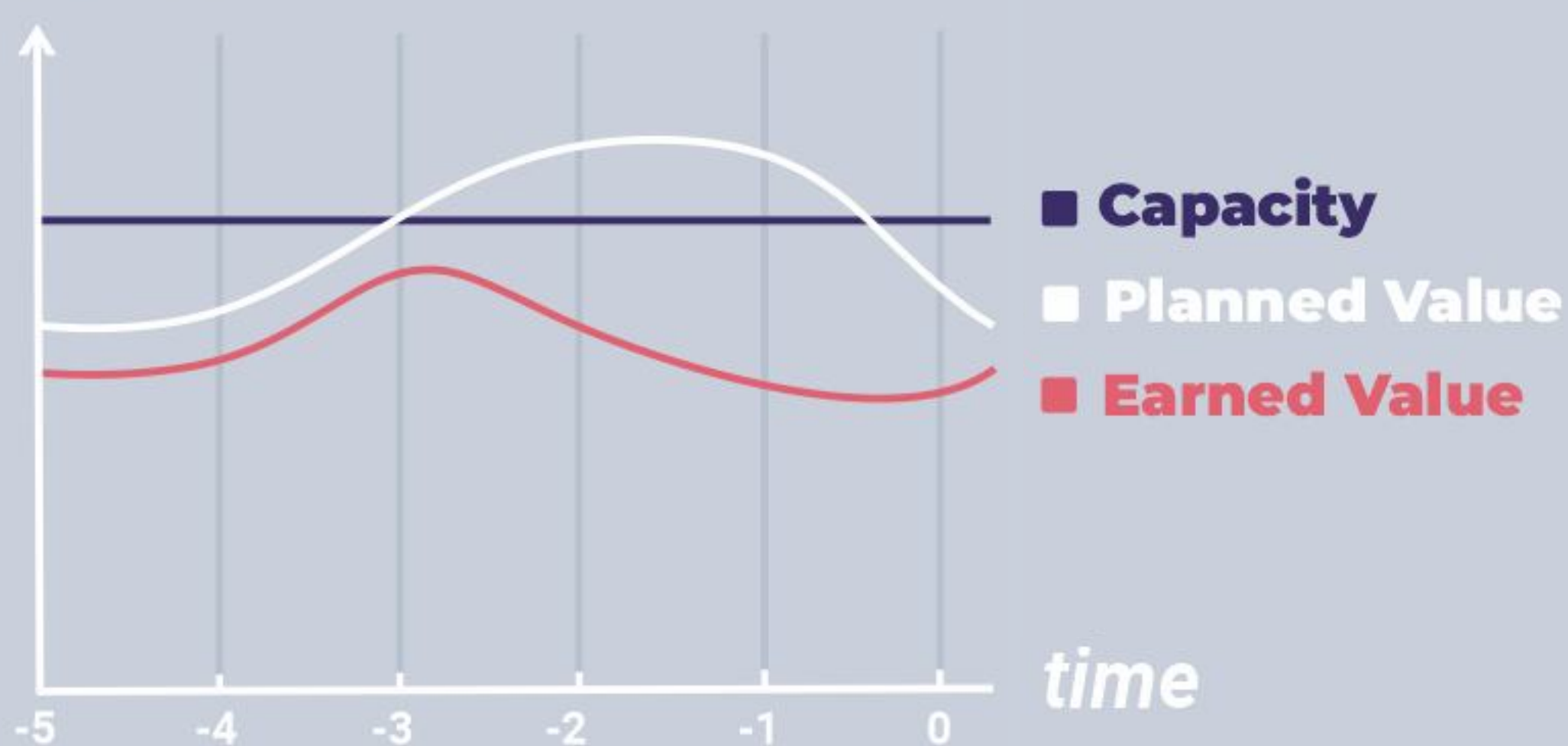
## Paragraph 2. Introducing Earned Value on Resources

In our analysis, we start with a resource group. The resource group can be a group of humans with certain skills (e.g. electrical engineering), but also equipment like test stands, cranes, and others.

We define Earned Value on Resources (EVR) as the value of the work realised by the resource group. We compare this with the planned value (PV) calculated from the aggregated planned value that derives from the project schedules of all projects in the portfolio. These are portfolio metrics, not project metrics. Another important parameter is the resource group capacity, which shows how much work can be done in a unit of time for one resource group.

### Earned Value on Resources

*w/h per hour*







This Graph is historical.

**The blue line** shows how much capacity we had. These are units of potential Capacity (e.g. working hours) per unit of time (e.g. hours).

**The white line** shows Planned Value, the amount of work to be done in a specific unit of time according to the aggregated demand from project schedules that need resources from this group.

**The red line** shows us the Earned Value according to the original estimates.

When there is sufficient Planned Value but insufficient Capacity, we observe a devaluation in the Earned Value on Resources, indicating the resource group cannot meet project demand. These issues become apparent before they are reflected in traditional EVM and allow us to simulate potential EVR, and EV on projects, into the future based on the mitigating actions we choose to take. Additionally, we compare actual hours spent on tasks to the Earned Value, providing insight into the cost of task completion (this is not shown in the graph).

By using this information, we can apply predictive analytics (AI) to forecast potential project delays. The primary goal is to prevent resource overload, protecting the entire project portfolio from increased waiting times and decreased productivity.

The area of planned value above capacity will eventually cause project delays and a drop in Earned Value. This example uses working hours, but monetary units can also be used.



## **Paragraph 3. Impact of Earned Value on Resources on Clients**

The implementation of EVR has shown remarkable results for our clients and ourselves. As reported by Tromp & Homan (2015), and corroborated by our own findings, EVR can increase productivity in multi-project environments by 15% to 30%, particularly in engineering departments. This leads to a higher number of successfully delivered projects with the same resources and significantly reduced project durations.

## **Conclusion**

The Earned Value on Resources technique offers a proactive approach to project and portfolio management, allowing organizations to identify and address potential issues before they impact project outcomes. In contrast, traditional Earned Value Management only reflects past performance. By protecting resources from overload, EVR enhances productivity and efficiency, safeguarding the future success of projects.





## References

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