Honeywell’s advanced process control solution has yielded significant economic and operational benefits for Deza. Project payback was less than six months, and the controller service factor has been greater than 99 percent since it was commissioned.

**Benefits**
Advanced process control (APC) can be a very useful tool when it comes to improving process performance and increasing capacity. Even small capacity boosts can be worthwhile, especially when they are achieved without major investment and demand for the product is strong.

This was the situation for Deza, a Czech company that specializes in processing coal tar and crude benzol. Deza wanted to improve the performance of its phthalic anhydride (PA) plant at Valasske Mezirici in the Czech Republic, and asked Honeywell to conduct an APC benefits study.

After a detailed survey taking into account all PA reaction sections, Honeywell concluded that the air compressor, which would pose a bottleneck during peak production, feed preparation and the reaction sections, would benefit most from APC.

Honeywell APC has yielded significant economic and operational benefits for Deza. A subsequent performance guarantee audit found that the project payback was less than six months, and that the controller service factor has been greater than 99 percent since it was commissioned in October 2006.

**Background**
Based in the Czech Republic, Deza's business is based on processing benzol and crude coking tar. Both starting materials are byproducts of coke production from coal. Deza's business includes production of basic aromatic commodities, organic intermediates, aromatic specialties and phenol homologues, purchase and sale of chemical products, and R&D and analytical activities in organic chemistry.

With benzol processing capacity of 150,000 MT/a and 400,000 MT/a of crude coal tar, Deza is a major player in the global market. Deza is also active in environmental management, including the chemical industry’s Responsible Care Program.
Challenge
The Deza PA process consists of seven functional processes and two support processes. In order to improve performance, Deza had several objectives:
- Maintain the reactant concentration in the oxidizing reactor below its upper limit
- Ensure the reactant concentration in the feed section does not reach explosive limits
- Keep the turbo blower throughput below or at the operation specified upper limit
- Maintain the oxidation reactor catalyst temperatures within safe limits
- Make sure controller outputs stay inside specified limits
- Maximize the crude PA production

Solution
Honeywell's solution was to install Profit® Controller, its multivariable control and optimization software, covering the air compressor, feed preparation section and oxidizing reactor. In addition, the Profit Toolkit application validates the oxidizing reactor temperature and continuously updates them in Profit Controller. Honeywell's Uniformance® PHD (Process Historian Database) reports and issues trend forecasts for key data, helping improve process plant analysis. Honeywell's performance monitoring package provides useful statistics on the controller’s performance in terms of online time, standard deviation from controlled variables (CVs), constraint activity and more.

Profit Controller has been widely used in the refining and petrochemical industry. It centers on the patented range control algorithm (RCA), which controls all CVs within their ranges and allows the Profit Controller to explicitly constrain all of the CVs dynamically into the future. RCA keeps Profit Controller online in situations where other multivariable controllers become unstable.

Product Value Optimization (PVO) is a dynamic rather than steady-state solution, which lets Profit Controller optimize the entire unit faster and potentially offers a more precise and more profitable final solution. PVO finds not only the steady-state solution, but also the optimal dynamic path leading there. PVO is treated as part of closed-loop control and is unified into the RCA. As a result, optimization speed can be tuned independently of the speed of CV error correction.

Honeywell's study predicted that the increase in crude PA production would lead to a nine-month payback for the project. This has since been revised to six months. Comparing the performance of the PA unit using APC with its performance without it shows that not only has the production rate increased, every ton of PA produced now consumes less utilities and raw materials than before.

Key to the project's success was operator acceptance throughout the project schedule and strong management support allowing control engineers to fully participate and take responsibility for all project phases including controller design, basic controller tuning, plant step testing, implementation and commissioning of the multivariable predictive controllers. Rigorous attention and resolution of regulatory control problems before implementation of the advanced controls was a major factor in achieving the high level of robust control.

For More Information
Learn more about Honeywell’s Uniformance® PHD visit our website www.honeywellprocess.com/software or contact your Honeywell account manager.

Honeywell Process Solutions
Honeywell
1250 West Sam Houston Parkway South
Houston, TX 77042
Honeywell House, Arlington Business Park Bracknell,
Berkshire, England RG12 1EB UK
Shanghai City Centre, 100 Junyi Road
Shanghai, China 20051
www.honeywellprocess.com