

NASA and European Cooperation Lessons Learned Based on the Rosetta Experience. Arthur B. Chmielewski¹
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Introduction: Rosetta is an international mission to the comet Churyumov-Gerasimenko 67P. The mission is led by ESA with participation from NASA and 12 countries. Approximately 300 scientists who represent an international plethora of universities, institutes, government agencies and private entities and hundreds of engineers, business managers, technicians and media personnel have taken part in Rosetta. Rosetta is truly a cornerstone or, as we call it in the US, a flagship mission.

The author of the paper has been the Project Manager of the NASA portion of the mission for the last six years. In that time, science mission operations have been developed, the spacecraft went in and out of hibernation, encountered an asteroid, orbited the comet and landed both the lander and the orbiter on its surface. There were numerous technical and programmatic issues on both sides, changes in personnel and adjustments to the budget.

The mission taught us a lot about comets and the early solar system but it also gave NASA great lessons on how to conduct international cooperation.

The paper will discuss the following topics based on the Rosetta experience:

- How the Project tailored the management structure of instrument teams depending if the PI is from NASA or Europe.
- What are the major differences between ESA and NASA management structure and how Rosetta made them work for the benefit of the mission.
- NASA and ESA reviews are very, very different. How to conduct joint reviews without creating chaos.
- ESA missions are funded in a completely different way, on a different cycle, governed by different political forces than those present in the US.
- ESA and NASA have different approach to risk management, operations and mission assurance. It is important to understand these differences and use them to strengthen the mission and not to defeat it.
- ITAR is an unavoidable component.
- Coordination of media and public outreach requires careful planning to assure

that the credit is given to the proper research institution or sponsor.

- International cooperation among the instrument teams is a daily staple of the mission. This can be a source of frustration or, if well designed, can strengthen the teams.

The paper will conclude with a Rosetta cookbook of recommendations for the future managers and PI's of international missions.