

Review Report
on
Milestone-Proposal: The Engineering Data Analysis System sNOVA, 1989-2008

Date: 03/17/2025

SUMMARY:

This proposal (hereafter, “the Proposal”) presents the development, achievements, and importance of the sNOVA system, an Engineering Data Analysis (EDA) system from Macronix International Co., Ltd (or MXIC, a Taiwan-based, non-volatile semiconductor memory company). Since 1989, MXIC has devoted to promoting computerization and automation in its semiconductor manufacturing. The development of sNOVA was based on IBM NOVA System, an IT software solution used primarily for engineering data analysis, process control, and yield management in semiconductor manufacturing during the 1990s. In Years 2004 to 2008, MXIC utilized JAVA to develop sNOVA in-house, with the help of some statistical tools like SPSS and MATLAB, to improve product quality and manufacturing efficiency. After Year 2008, MXIC continues to improve the sNOVA system and applies more advanced technologies in their production scheduling and image recognition applications.

The Proposal is a revision of its previous submission, entitled “Milestone-Proposal: The Engineering Data Analysis System sNOVA, 1989-1997”. As the author mentions that earlier works of sNOVA before Year 1997 were not openly published, the Proposal is thus revised by adding some materials that supports the achievements by sNOVA during Years 1998 to 2008 [7]-[11].

General Comments/Suggestions:

1. There are no obvious issues/concerns in this revised proposal, the Proposal.
2. The wording of the Plaque Citation is accurate.
3. The supporting texts and evidences presented in the Proposal are sufficient and accurate to support the Citations.
4. The Proposal represents the historical significance and technological importance of the Engineering Data Analysis, sNOVA, in three folds:
 - 1) sNOVA pioneered in the applications of statistics, big data, and artificial intelligence in semiconductor manufacturing, starting from Year 1989.
 - 2) Since Year 2017, sNOVA has effectively improved product quality, with defects measured from PPM (parts per million) to PPB (parts per billion) levels.
 - 3) sNOVA demonstrates that innovative methods are effective in solving engineering problems through statistical analysis, computer simulation and experimental verification.
5. One minor suggestion. As a technical recommendation document, some wordings (e.g., world’s first, the first in the world, ...) in the article could be hyperbole or overstated, if without strong supporting evidence. Please consider more honest and modest in the statements.
 - 1) ... Macronix as the *world's first paperless fab* ...

- 2) ... the *world's first memory company* to measure product defect rates in parts per billion (PPB) rather than parts per million (PPM)
- 3) *the first in the world to apply statistics* to semiconductor production ...
- 4) Macronix became *the first company in the world* to significantly decrease product defect rates ...
- 5) ...

— —End of the Review Report — —