DEVELOPMENT OF A FHTS SOLVER BASED ON CEDRIC SPATIAL

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OBJECTIVE

TO DEVELOP A 2-Φ TRANSIENT SOLVER IN FHTS BASED ON CEDRIC SPATIAL THERMO-HYDRAULIC SOLVER

WHY ? : TO TAKE ADVANTAGE OF CEDRIC PERFORMANCE
(cf. comparisons since beg. 90's)

HOW ? : DEVELOPMENT OF A PROTOTYPE WITH LIMITED FUNDING
- use of existing CEDRIC thermo-hydraulic solver
- extension of the existing CEDRIC thermal solver to full networks

OBJECTIVE : MORE RELIABLE SOLVER (STABILITY, CONVERGENCE ∆t, ...)
FASTER SOLVER (ratio > 5 minimum)

QUESTION : IS THE DEVELOPMENT OF A FHTS SOLVER BASED ON CEDRIC SPATIAL WORTH WITH REGARDS TO OTHER FHTS SOLVERS AVAILABLE AT THE END OF THE DEVELOPMENT ?

DEVELOPMENT ORGANISATION

DECLARATION OF INTENT (ALSTOM, CEA, CNES, ESA, PRINCIPIA, TECHNICATOME)

CNES R&D CONTRACT TO PRINCIPIA R.D.

1) DEVELOP A FULL THERMAL SOLVER IN CEDRIC SPATIAL ("CEDTAN") TO GET A FULL THERMO-HYDRAULIC SOLVER

2) IMPLEMENT THIS SOLVER IN FHTS AS A PROTOTYPE ("SOLCED")

3) INDUSTRIALIZE THE PRODUCT WITH ESA & ALSTOM ("?"")
RESULTS

CPU TIME FOR 3 TEST CASES (base 100 = ESATAN/FHTS V8.5 / FGENFI):

- NH3 LOOP (100 = 24 s)
- H2O LOOP (100 = 33 s)
- ANTENNA LOOP (100 = 27 min 17 s)

CONCLUSION

GOOD RESULTS ...

BUT CANNOT COMPETE WITH ALREADY INTEGRATED SOLVERS

=> RESULTS CAN'T JUSTIFY THE DEVELOPMENT OF THIS NEW FHTS 2-Φ TRANSIENT SOLVER

DEVELOPMENT IS STOPPED