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SCIENCE AND ENGINEERING RESEARCH COUNCIL
RUTHERFORD APPLETON LABORATORY

INFORMATICS DIVISION

SOFTWARE ENGINEERING GROUP NOTE 107

AFTER ALVEY
Some Headings

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1. INTRODUCTION

Here are some brief notes on topics for a submission to the After Alvey committee about Software Engineering.

These are pretty much a first cut off the top of my head because of the pressure to concentrate on the ACARD report.

I suggest that we produce a document which is an updated version of the Yellow Book, incorporating what we have learnt since 1983.

2. GLOBAL

The main headings for planning a program are

1. What our international competitors are
 - a. capable of now
 - b. have got going now (MCC, SEI etc)
 - c. are going to do in the future.
2. Analysis of world market and future predictions so strategy can be based on international, industrial realism ie get the big picture right.
3. After Alvey in European Context.
4. Objectives, Strategy, Tactics
5. Management
6. Funding arrangements
7. Participants
8. Infrastructure
9. Lessons learnt from Alvey

3. INTERNATIONAL COMPETITORS

1. Software houses love doing such surveys! 100% and foreign travel thrown in!
2. But it should be done.

4. WORLD MARKET VIEW

1. Must state explicitly up front what we are trying to achieve
 - a. software tools selling industry?
 - b. software tools using industry?
 - c. supplier or user dominated programme?
2. Must get something in about scale and direction of world market and UK placement and future in this market else all rest of ideas will be built on sand!

5. EUROPEAN CONTEXT

1. Need to spell out what EEC is doing and how it related to UK market ambitions so can place After Alvey in correct world, European, National Contexts. Also avoid 'political' problems!

6. OBJECTIVES, STRATEGY, TACTICS

I suggest we use O-S-T as in the Yellow Book ("Rob(b)"s seem to like O-S-T!).

7. OBJECTIVES

1. The current Alvey objectives should remain so first objective is to 'complete the Yellow Book'.
2. This means concentrating on the creation of ISF/IPSE to achieve quality and productivity.
3. What new objectives? Something based on World Market analysis and UK aspirations.

8. EXISTING ALVEY STRATEGY

1. The original Yellow Book strategy is still pretty good overall and needs seeing through. Obviously it needs updating in the light of the past couple of years activity.
2. Innovation, Integration, Exploitation still quite nice. Add 'Demonstration' between Integrate and Exploit?
3. Innovation: need to keep the long term stuff going in the universities. Need to get industry doing more medium term stuff.

4. Integration: need to document our IPSE 1,2,3 generation strategy more thoroughly in the light of events and experience. We need to put something in the Tactics section about how we are handling Aspect, ECLIPSE, IPSE 2.5 and the third generation study so we can achieve continuity of planning.
5. Exploitation: We need to update the tactical section with our plans for data library, CSR handbook, DP users club, STDC/NCC, Maths for Programming etc to ensure continuity of planning and direction.

9. NEW STRATEGY

1. What should be done 1988-1995 timescale, and 1990-2000 timescale that we are not doing now? Keep up the 5 and 10 years horizons.
2. We need to put more emphasis on the ISF (as opposed to IPSE) to stress the need to integrate all of CAD for software, hardware, VLSI and overall systems design.
3. Make it clear that IKBS is 'software' therefore it is part of any 'Software' programme after Alvey. IKBS headings include
 - a. s/w tools and environments (Loops, Smalltalk etc)
 - b. s/w techniques (shells)
 - c. applications and demonstrators.
4. We need to emphasise that in cost terms
 research << development << product marketing.
 Thus we need to ensure that the research done is adequately developed ie plan the development not just hope it happens.
5. Above means planning to produce prototypes and demonstrators explicitly. Remove the pre-competitiveness research restriction if possible. Make it link in with DTI schemes if sensible.
6. Need to stress, and plan, technology transfer as explicit activity.
7. Need to have training for middle and senior managers and technicians as part of plan.
8. Need to have explicit programme of more applications orientated research not just software tools.

9. Need to have an explicit programme of software products research (different to applications research which can be methodological).
10. Reusability should be a major goal.
11. We need to explicitly address the issue of project/programme organisation.
 - a. Should we have a central research and technology transfer institute ? (YES!)
 - b. Should all projects be collaborative as in Alvey? Would it be sensible to give some flexibility here?
 - c. Should all projects be geographically dispersed? Why not insist on some being single site (even of collaborative).

10. MANAGEMENT

1. Which style? Responsive, Coordinate, Directed?
2. Management team should be big enough and have adequate technical as well as administrative backup.
3. Could use small team and subcontractors?
4. Directed is best by far if people good enough. This is crucial. Need to identify where the people coming from, for how long and on what terms. There is a vital need for continuity of staffing else the spirit, vision, and collective wisdom will be lost/broken up and decay into mere bureaucracy will result.

11. FUNDING

1. We need to get a flexible funding arrangement such as discretion to fund up to 100% for small amounts/companies/vital things. Whilst perhaps going as low as 10% for something GEC were going to do anyway. This is in my paper to Oakley about 'lessons learnt'.
2. We need a single IPR agreement and a single bureaucratic mechanism for contracts etc.
3. We must explicitly cost the programme over 10 years. Get the scale right as we need to move into 'capital intensive' thinking very soon. £30M per annum at 1986 prices of Government money?

4. What about getting private Venture Capital people to put in some money so we can have a complete pipeline from

research → development → new business

all within one managed programme (but with money for each stage from appropriate source)?

Pool of contributors to After Alvey Venture Fund (they can sit on the Board to make sure decisions are ok but gives nice route and better planning etc). (I like this idea!).

5. For those projects run 'in the field' we must decide on policy of 'concentration' or 'thin spread'.

Alvey has spread thinly. Would have been better (especially academically) to concentrate more. We need to make explicit the need to concentrate in academia. So building up centres of expertise and critical mass and cutting out the dead wood and 'too small' outfits.

6. All projects should be funded with annual (Gov FY) cash limits to stop stupidly we have now and enable proper budgets to be operated. This is crucial - the proper budgets business.

12. PARTICIPANTS

1. need to keep academia cooperating with industry
2. need to keep government departments cooperating
3. need to involve small firms more ($\leq 100\%$ funding the only way).
4. need to involve (at arms length) more departments than Alvey because UGC, DHSS etc have role to play
5. need to try to promote industrial restructuring somehow before USA buys up all UK software houses, or just takes the market.
6. We need to sort out explicitly the policy towards USA companies (non European foreigners).
7. We need to sort out explicitly the position of European companies (eg Phillips UK) in AA projects.
8. We need to do some explicit manpower planning (as we did privately in 1983). This will make estimating the funding much more accurate and believable.

13. INFRASTRUCTURE

1. E-mail is still not widespread enough and vital.
2. Alvey Infrastructure has been disaster so far.
3. Need proper planned development and installation.
4. Infrastructure means software and systems planning must dominate hardware issues.
5. Infrastructure should not be misused to subsidise useless UK products.

14. LESSONS LEARNT FROM ALVEY

1. Academic/industrial collaboration is good thing.
2. Industrials can collaborate too.
3. Need for professional budget management.
4. If quality right then secondment to directorate is best way to run programme.
5. Continuity is greatest need; of people in Directorate and on projects; on rate of funding so there when needed etc.
6. Need to involve DP side more.
7. Need to involve applications side generally much more.

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