

DRM ASSOCIATES PORTFOLIO MANAGEMENT CONSULTING

**Kenneth Crow
DRM Associates**

KENNETH CROW

- 30+ years consulting in product development & IT
 - Former Director, Mfg. Consulting, Ernst & Young
 - President, DRM Associates
- Recognized expert in product development, project management, and portfolio management
- Certified New Product Development Professional
- Frequent international speaker and author
- Former President & Director of the Society of Concurrent Product Development



For further information on Ken, see
www.npd-solutions.com/kcrow.html

DRM ASSOCIATES

- Firm with recognized expertise in product development, project management, and portfolio management
- Kenneth Crow is the firm's Principal consultant
- Nine other highly-experienced consultants; two with extensive portfolio & pipeline management experience
- Extensive client list - Fortune 500 and international clients
- Led consortium to identify 270 best practices of product development
- Extensive training experience and materials - conducted over 200 workshops

PORTFOLIO MANAGEMENT

Definition:

The process of selecting and managing new product ideas, proposed projects and current development projects as a portfolio to 1.) maximize the value of the portfolio, 2.) keep it in balance, and 3.) align it with company strategy. By characterizing and reviewing the projects in a company's portfolio as a whole, a big picture is presented and used to prioritize and select projects.



PORTFOLIO MANAGEMENT ELEMENTS

1. **Product strategy** specifies:

- New product goals (e.g., sales from new products)
- Areas of focus (e.g., those markets and product areas that new products will be developed for)
- Relative priorities (e.g., the breakdown of R&D investment by market, product area & project type)

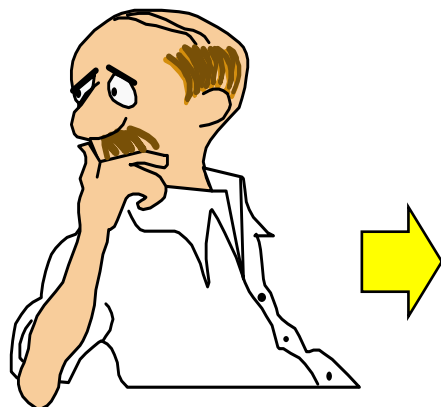
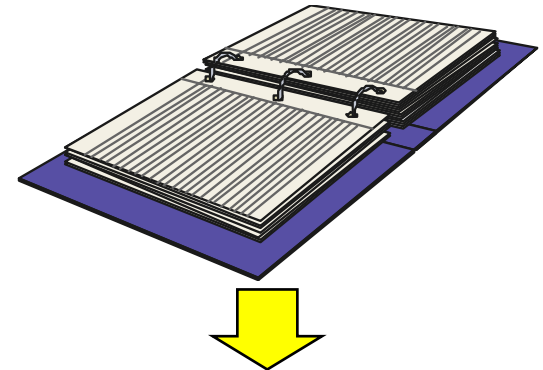
2. **Product development process** has gates where go/kill decisions are made on individual projects and hence resources are allocated

3. **Portfolio Review** where the executive management periodically reviews all projects & determines: Do we have the right projects? Is this really how we want to spend our money?

STARTS WITH STRATEGY & BUSINESS PLAN

- Strategy defines goals & direction
- Business Plan defines capacity
 - R&D budget
 - R&D headcount
- Dictates how many projects we can undertake in a fiscal period(s)

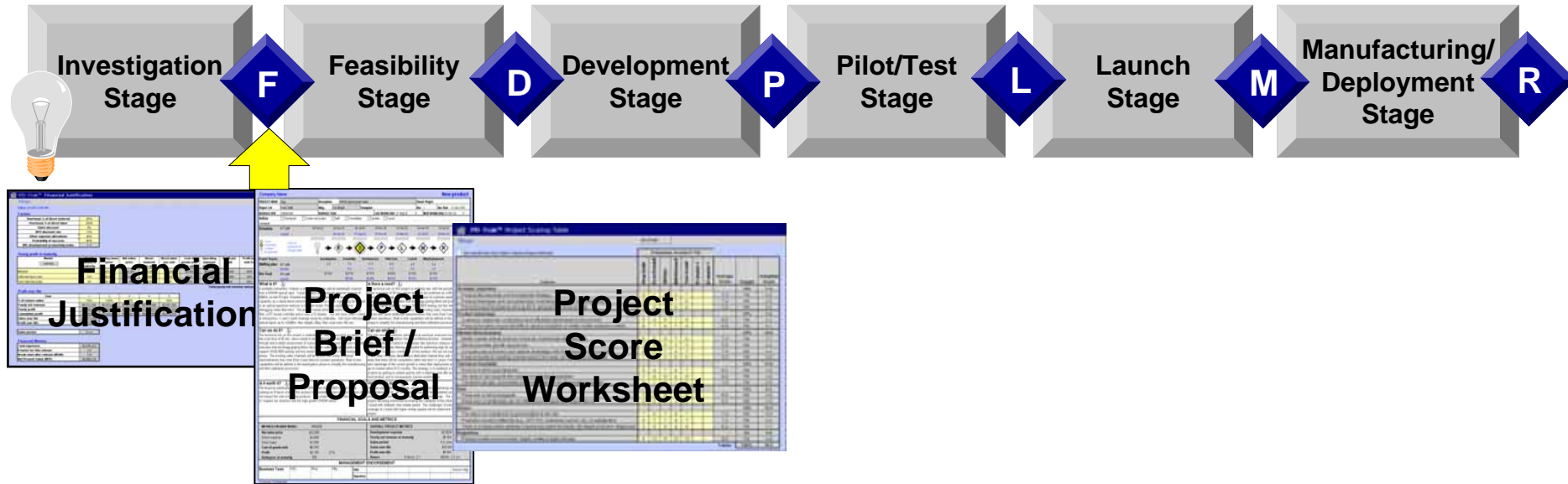
Business Plan



Business Strategy

PROJECT NAME	Status	PROJECT METRICS				
		Project expense	Revenue Enhancement	NPV	Management Priority	Score
		Expense remaining	Cost Reduction	Estimated Man-months	Prob of success	Duration
Pisces	Active	\$313,170	\$1,550,000	\$211,438	1	85
SAP maintenance	Ongoing	\$143,170	\$640,000	24.0	90%	12 months
Andromeda	Proposed	\$178,115	\$8,495,000	\$2,288,619	3	83
Portfolio management software	Investigation	\$178,115	\$5,140,250	32.0	60%	13 months
Gemini	Active	\$742,212	\$14,400,000	\$3,469,558	4	81
Web page redesign	Development	\$111,044	\$5,568,000	39.0	50%	14 months
Leo	Proposed	\$1,219,710	\$16,200,000	\$3,295,242	2	80
Investigation of Web 2.0 and Ajax	Investigation	\$1,199,710	\$5,850,000	15.0	80%	6 months
Virgo	Active	\$2,501,231	\$45,623,116	\$3,843,412	3	77
Financial system upgrade	Test	\$812,651	\$9,000,599	46.0	70%	8 months
Taurus	Proposed	\$1,362,210	\$36,000,000	\$3,765,607	2	70
IP telephony	Investigation	\$1,362,210	\$7,400,000	14.0	60%	20 months
Aries	Active	\$1,145,625	\$15,750,000	\$5,074,857	4	65
Supply chain management system	Design Analysis	\$955,467	\$8,158,500	66.0	75%	20 months
Virtual Technologies	Proposed	\$2,187,385	\$10,200,000	\$2,438,946	1	63
Post-processing enhancement	Not started	\$2,060,228	\$7,715,000	31.0	75%	19 months

STAGE / PHASE-GATE REVIEWS



- Stage/phase-gate evaluations are often the source of the information for portfolio evaluation and ranking
- Initial screening of project proposals for adequate business case & fit – rigor prevents expenditure of resources for less desirable projects
- Subsequent gate reviews insure resources are only applied to projects that fit the portfolio criteria and have a high priority

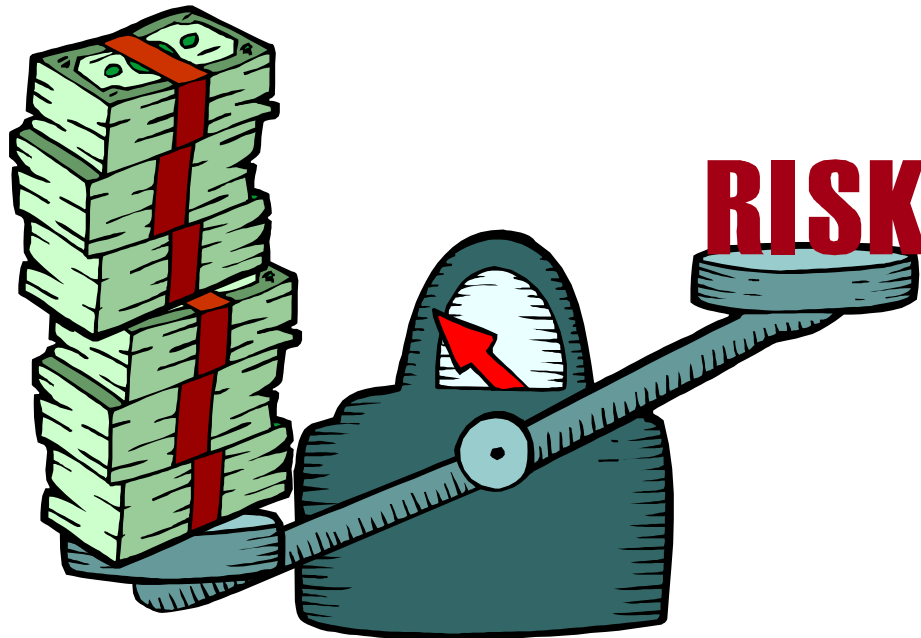
REQUIRES EFFECTIVE GATE PROCESS

Portfolio Management requires an effective gate process to kill bad or marginal projects. This can be a challenge because:

- Management can have a tough time killing projects - “sacred cows” and personal commitment
- Lack of effective gate criteria
- Projects get a life of there own
- Teams tweak the project business case until acceptable

PORTFOLIO MANAGEMENT GOALS

1. Maximize the value of the portfolio
2. Seek balance in the portfolio
3. Keep portfolio projects strategically aligned



PORTFOLIO MANAGEMENT TECHNIQUES

	Financial - NPV, ROI, IRR, DPI	Project Scoring	Strategic Allocation	Charts & Roadmaps
1. Maximize the value of the portfolio				
2. Seek balance in the portfolio				
3. Keep portfolio projects strategically aligned				

PORTFOLIO MANAGEMENT APPROACH

Annual/
5 Year
Business
Plan

R&D Budget
R&D Headcount

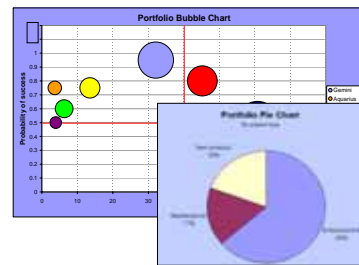
Strategic Allocation
Corporate or BU/PL Level

	Technology Development	New Products	Enhancements & Line Exten.	TOTAL
Business Unit A	7%	24%	4%	35%
Business Unit B	2%	16%	7%	25%
Business Unit C	0%	6%	11%	17%
Business Unit D	2%	14%	6%	22%
TOTAL	11%	60%	28%	99%

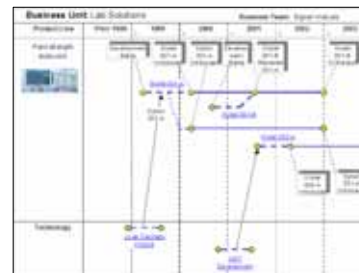
Corporate or BU
Portfolio Mgt.

PROJECT NAME	PROJECT METRICS				
	Project expense remaining	Sales over life	NPV	DPI	Score
Project Description / Project Milestone		Profit over life	R-factor	Prob of success	Duration
<u>Pisces</u>	\$313,170	\$1,550,000	\$211,438	1	85
Turbo charger life extension	\$163,170	\$640,000	2.0	90%	9 months
<u>Andromeda</u>	\$178,115	\$8,495,000	\$2,288,619	8	83
Portfolio management software	\$178,115	\$5,140,250	28.9	60%	13 months
<u>Gemini</u>	\$742,212	\$14,400,000	\$3,469,558	12	81
High efficiency compressor	\$146,538	\$5,568,000	7.5	50%	14 months
<u>Leo</u>	\$1,219,710	\$16,200,000	\$3,295,242	2	80
Next generation, high capacity hard drive	\$1,214,710	\$5,850,000	4.8	80%	25 months
<u>Virgo</u>	\$2,704,731	\$45,623,116	\$3,252,963	2	77
DWDM optical power meter	\$997,605	\$8,404,044	3.1	70%	25 months
<u>Taurus</u>	\$1,362,210	\$36,000,000	\$3,765,607	2	70
Fuel tank leak detection system	\$1,362,210	\$7,400,000	5.4	60%	20 months
<u>Aries</u>	\$1,145,625	\$15,750,000	\$5,074,857	4	65
3.8L V8 enhancement	\$990,021	\$8,158,500	7.1	75%	20 months
<u>Aquarius</u>	\$290,101	\$3,150,000	\$679,104	13	55
High power compressor	\$48,387	\$1,218,000	4.2	95%	10 months
<u>Saturn</u>	\$5,126,154	\$128,800,000	\$5,961,171	1	
Enhanced Equities Trading Sys	\$5,126,154	\$16,340,000	3.2	75%	18 months
<u>Virtual Technologies</u>	\$2,187,385	\$10,200,000	\$2,438,946	1	
Post-processing audio enhance.	\$2,118,298	\$7,715,000	3.5	75%	19 months

Project Scoring
and Prioritization



Review to
Ensure Balance



Review to Consider
Roadmap Relationships
(Technology & Platforms)

STRATEGIC ALLOCATION METHOD

- The business strategy dictates the allocation of resources into buckets
- Projects are rank ordered within buckets
- Different criteria are used to rank order projects for each bucket

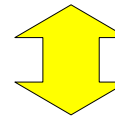
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STRATEGIC ALLOCATION BASIS

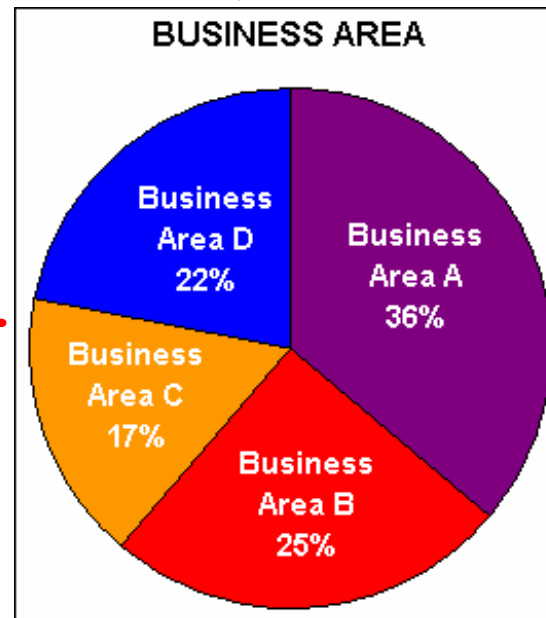
- **Strategic goals** - defending the base, expanding the base, diversifying, etc.
- **Business unit allocation**
- **Product line allocation**
- **Market segment allocation**
- **Project type** - new product, upgrade, process improvement, cost reduction, technology development, research, etc.
- **Familiarity** - product technology newness, process newness, market newness, etc.
- **Geography**

STRATEGIC ALLOCATION METHOD

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Measure resulting portfolio mix to assess whether it achieves desired allocation

PORTFOLIO INFORMATION

Prioritized list of projects with portfolio information for decision-making

			PROJECT METRICS						
PROJECT NAME	Status	Current phase	BU/product line	Project leader	Project expense	Sales over life	NPV	DPI	Score
Project Description / Project Milestone	Next review date	Next review type	Process name	Marketing lead	Expense remaining	Profit over life	R-factor	Prob of success	Duration
Pisces	Active	Development	Automotive	John Harris	\$313,170	\$1,550,000	\$211,438	1	85
Turbo charger life extension	4-Mar-07	P-Gate	Maintenance		\$163,170	\$640,000	2.0	90%	9 months
Andromeda	Proposed	Proposed	Software	Andy Nichols	\$178,115	\$8,495,000	\$2,288,619	8	83
Portfolio management software	1-Apr-07	Start	New Product Software	Bill Sharp	\$178,115	\$5,140,250	28.9	60%	13 months
Gemini	Active	Development	Industrial	Mike Brown	\$742,212	\$14,400,000	\$3,469,558	12	81
High efficiency compressor	6-Dec-06	P Gate	Product Enhancement	Tom Wright	\$146,538	\$5,568,000	7.5	50%	14 months
Leo	Proposed	Proposed	Technology	Brian Walker	\$1,219,710	\$16,200,000	\$3,295,242	2	80
Next generation, high capacity hard drive	1-Feb-07	Start	New Product		\$1,214,710	\$5,850,000	4.8	80%	25 months
Virgo	Active	Development	Technology	Ken Black	\$2,704,731	\$45,623,116	\$3,252,963	2	77
DWDM optical power meter	2-May-07	Update	New Product	Tom Wright	\$997,605	\$8,404,044	3.1	70%	25 months
Taurus	Proposed	Proposed	Industrial	Mike Brown	\$1,362,210	\$36,000,000	\$3,765,607	2	70
Fuel tank leak detection system	1-Apr-07	Start	New Product		\$1,362,210	\$7,400,000	5.4	60%	20 months
Aries	Active	Feasibility	Automotive	Frank Smith	\$1,145,625	\$15,750,000	\$5,074,857	4	65
3.8L V8 enhancement	19-Feb-07	D Gate	Product Enhancement	Bill Sharp	\$990,021	\$8,158,500	7.1	75%	20 months
Aquarius	Active	Pilot/Launch	Industrial	Mike Brown	\$290,101	\$3,150,000	\$679,104	13	55
High power compressor	2-Nov-06	P Gate	Product Enhancement	Tom Wright	\$48,387	\$1,218,000	4.2	95%	10 months
Saturn	Proposed	Proposed	Software	Philip Sparacino	\$5,126,154	\$128,800,000	\$5,961,171	1	
Enhanced Equities Trading Sys			New Services	Eric McNeil	\$5,126,154	\$16,340,000	3.2	75%	18 months
Virtual Technologies	Proposed	Definition	Consumer	David Tan	\$2,187,385	\$10,200,000	\$2,438,946	1	
Post-processing audio enhance.			DTS New Product	Sharon Faltemier	\$2,118,298	\$7,715,000	3.5	75%	19 months

PROJECT SCORING

Criteria	Steve Wright	Bill Sampson	Ralph Porter	Horosi Anaki	Terry Arthur	Average Score	Weight	Weighted Score
Strategic alignment							16%	12.6
Product fits business unit & enterprise strategy	8	7	9	7	8	7.8	7%	5.5
Product leverages core competencies: marketing, technical, manufacturing	7	8	7	8	9	7.8	4%	3.1
Product supports balance among BU's, geography & product lines	8	9	8	7	8	8.0	5%	4.0
Product Advantage							11%	7.7
Customer needs are understood and effectively addressed by the product	7	6	7	6	8	6.8	5%	3.4
Product provides unique benefits or value proposition or better meets customer needs	6	7	8	7	8	7.2	6%	4.3
Market Attractiveness							22%	17.4
Meets market criteria such as minimum market size requirements	8	8	9	8	9	8.4	5%	4.2
Market provides growth opportunity	7	10	9	7	8	8.2	6%	4.9
Company can achieve a competitive advantage with this product in this market	8	8	8	9	8	8.2	6%	4.9
Product meets an existing market need or the need can be readily developed	7	7	7	6	7	6.8	5%	3.4
Technical Feasibility							16%	11.7
Product is technically feasible	6	8	7	6	7	6.8	6%	4.1
We have or can acquire the needed knowledge & expertise	8	8	7	6	8	7.4	5%	3.7
The technical gap, complexity, & technical risk can be adequately managed	9	7	8	8	7	7.8	5%	3.9
Risk							12%	9.7
There are no show stoppers	7	8	9	7	10	8.2	6%	4.9
Risks and uncertainties can be effectively managed and responded to	7	8	8	8	9	8.0	6%	4.8
Return							18%	12.6
The return on investment is good relative to the risk	7	7	6	6	7	6.6	6%	4.0
Product's overall profitability (e.g., NPV, ROI, breakeven period, etc.) is satisfactory	8	7	7	6	6	6.8	6%	4.1
There is a reasonable certainty of achieving sales forecasts, the target price & target cost	8	8	8	7	7	7.6	6%	4.6
Regulatory							5%	4.0
Product meets environmental, health, safety & legal policies	7	8	8	9	8	8.0	5%	4.0
Totals:							100%	75.7

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Regulatory							5%	4.0
Product meets environmental, health, safety & legal policies	7	8	8	9	8	8.0	5%	4.0
Totals:							100%	75.7

Rank projects based on score or combination of metrics

	PROJECT METRICS				
	Project expense	Sales over life	NPV	DPI	Score
one	Expense remaining	Profit over life	R-factor	Prob of success	Duration
	\$313,170	\$1,550,000	\$211,438	1	85
	\$163,170	\$640,000	2.0	90%	9 months
	\$178,115	\$8,495,000	\$2,288,619	8	83
	\$178,115	\$5,140,250	28.9	60%	13 months
	\$742,218	\$14,400,000	\$3,469,558	12	81
	\$146,538	\$5,566,000	7.5	50%	14 months
	\$1,219,710	\$16,200,000	\$3,295,242	2	80
	\$1,214,710	\$5,850,000	4.8	80%	25 months
	\$2,704,731	\$45,623,116	\$3,252,963	2	77
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	\$2,187,385	\$10,200,000	\$2,438,946	1	
	\$2,118,298	\$7,715,000	3.5	75%	19 months

RANKING & SELECTING PROJECTS

PROJECT NAME Project Description / Project Milestone	PROJECT METRICS					12 Mo Reqmts	Cumulative Man-Months	Action
	Project expense Expense remaining	Sales over life Profit over life	NPV R-factor	DPI Prob of success	Score Duration			
Pisces Turbo charger life extension	\$313,170 \$163,170	\$1,550,000 \$640,000	\$211,438 2.0	1 90%	85 9 months	24	24	Go
Andromeda Portfolio management software	\$178,115 \$178,115	\$8,495,000 \$5,140,250	\$2,288,619 28.9	8 60%	83 13 months	30	54	Go
Gemini High efficiency compressor	\$742,212 \$146,538	\$14,400,000 \$5,568,000	\$3,469,558 7.5	12 50%	81 14 months	33	87	Go
Leo Next generation, high capacity hard drive	\$1,219,710 \$1,214,710	\$16,200,000 \$5,850,000	\$3,295,242 4.8	2 80%	80 25 months	15	102	Go
Virgo DWD optical power meter	\$2,704,731 \$997,605	\$45,623,116 \$8,404,044	\$3,252,963 3.1	2 70%	77 25 months	29	131	Go
Taurus Fuel tank leak detection system	\$1,362,210 \$1,362,210	\$36,000,000 \$7,400,000	\$3,765,607 5.4	2 60%	70 20 months	7	138	Go
Aries 3.8L V8 enhancement	\$1,145,625 \$990,021	\$15,750,000 \$8,158,500	\$5,074,857 7.1	4 75%	65 20 months	20	158	Go
Aquarius High power compressor	\$290,101 \$48,387	\$3,150,000 \$1,218,000	\$679,104 4.2	13 95%	55 10 months	30	188	Hold
Saturn Enhanced Equities Trading Sys	\$5,126,154 \$5,126,154	\$128,800,000 \$16,340,000	\$5,961,171 3.2	1 75%	18 months	40	228	Hold
Virtual Technologies Post-processing audio enhance.	\$2,187,385 \$2,118,298	\$10,200,000 \$7,715,000	\$2,438,946 3.5	1 75%	19 months	36	264	Kill

1. Determine core personnel resources (e.g., 13 people & 156 man-months)
2. Rank based on Score. Select projects until resources are consumed.
Evaluate balance of projects, project relationships & strategic alignment
3. Make go / kill / hold decisions

RANKING PROJECTS – DPI & SCORE

<div> <div></div> Active <div></div> Proposed/On hold </div>		PORTFOLIO INFORMATION					12 Mo Reqmts	Cumulative Personnel	Action
PROJECT NAME Description	BU/Prod Line Process	Project Remaining cost	Sales Profit over life	NPV R-Factor	DPI Prob. of Success	Score			
Capricorn DSP measurement engine	Technology New product	\$2,185k \$1,580k	\$16.0M \$7.1M	\$3.1M 3.3	1.6 85%	88.3	7.5	7.5	Go
Aries 3.8L V8 enhancement	Automotive Enhancement	\$978k \$253k	\$15.8M \$5.9M	\$3.5M 6.0	12.5 90%	87.4	5.0	12.5	Go
Pisces Turbo charger life extension	Automotive Maintenance	\$242k \$92k	\$1.2M \$0.5M	\$0.2M 2.1	1.8 90%	84.2	3.5	16.0	Go
Leo Next generation, high capacity	Technology New Product	\$2,446k \$2,446k	\$36.0M \$13.0M	\$7.6M 5.3	2.5 80%	80.0	10.0	26.0	Go
Virgo DWDM optical power meter	Technology New product	\$3,136k \$996k	\$50.0M \$7.3M	\$2.0M 2.3	1.8 90%	76.5	6.0	32.0	Go
Aquarius High power compressor	Industrial Maintenance	\$413k \$333k	\$3.2M \$1.0M	\$0.4M 2.4	1.1 95%	73.4	3.3	35.3	Kill
Gemini High efficiency compressor	Industrial Enhancement	\$1,152k \$842k	\$14.4M \$4.5M	\$2.3M 3.9	2.2 80%	70.2	7.0	42.3	Go
Taurus Fuel tank leak detection system	Industrial New product	\$1,292k \$1,292k	\$36.0M \$7.4M	\$3.8M 5.7	1.8 60%	70.0	4.0	46.3	Hold

1. Determine personnel resources (38 in example)
2. Consider ranking based on Score or DPI (Development Productivity Index = $\text{NPV} \times \text{Probability of Success} / \text{Development Cost Remaining}$). Evaluate balance, linkages & strategic alignment
3. Make go / kill / hold decisions

STRATEGIC ALLOCATION METHOD

Strategic allocation used with Development Productivity Index

Description	Project Type	Net Present Value	Prob. of Succ.	Develop. Cost	Dev. Prod. Index	New Prod 45%	Upgrade 35%	Tech. 20%
Budget Allocation						\$7,200,000	\$5,600,000	\$3,200,000
Field Strength Analyzer	Upgrade	\$3,415,564	90%	\$1,100,000	2.79		\$1,100,000	
Network Tester	New product	\$3,579,785	80%	\$1,196,000	2.39	\$1,196,000		
Broadband Optical Detector	Upgrade	\$1,561,897	95%	\$694,002	2.14		\$694,002	
Network Driver Software	Upgrade	\$758,040	95%	\$346,894	2.08		\$346,894	
Optical Sensor	New product	\$1,677,893	80%	\$756,611	1.77	\$756,611		
ATM Switch	Upgrade	\$1,093,648	95%	\$742,000	1.40		\$742,000	
DWDM Optical Power Meter	New product	\$4,433,684	80%	\$2,583,000	1.37	\$2,583,000		
Optical Coupling Module	New product	\$321,766	75%	\$187,453	1.29	\$187,453		
10GB Optical Transceiver	New product	\$3,546,755	80%	\$2,322,017	1.22	<u>\$2,322,017</u>		
Optical Demux	Upgrade	\$1,304,088	90%	\$983,671	1.19		\$983,671	
Optical Multiplexer	New product	\$428,408	75%	\$1,200,000	0.27	\$1,200,000		
DSP Measurement Engine	Technology	\$0	70%	\$933,000	0.00			\$933,000
Next Gen Optical Sensor	Technology	\$0	60%	\$2,405,000	0.00			<u>\$2,405,000</u>
1000GB Core Technology	Technology	\$0	60%	\$4,435,000	0.00			<u>\$4,435,000</u>
Total All Projects				\$19,884,648		\$8,245,081	\$3,866,567	\$7,773,000
Total Selected Projects						\$7,045,081	\$3,866,567	\$3,338,000

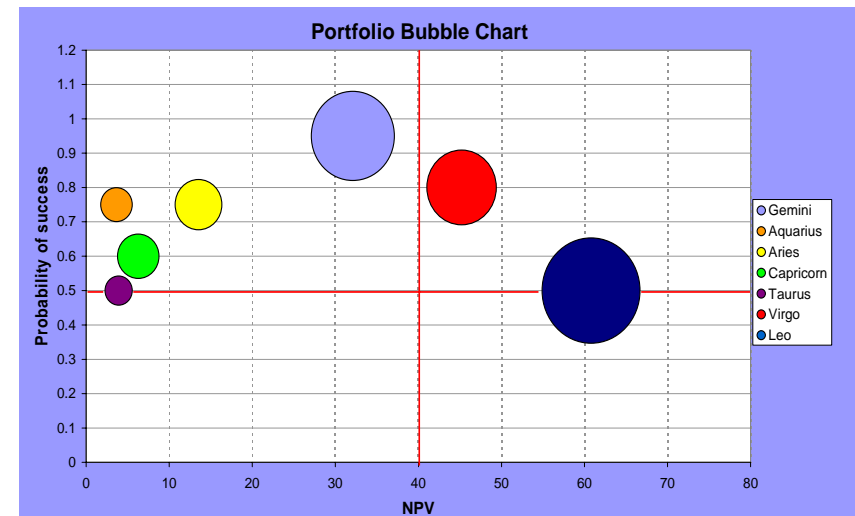
ACHIEVING BALANCE

Achieve Balance with Strategic Allocation or Goals

- **Strategic goals** – new business area, support new products or services, reduce cost
- **Project type** - new system, upgrade, maintenance, technology investigation, etc.
- **Business unit**
- **Product line**
- **Market segment**
- **Geography**

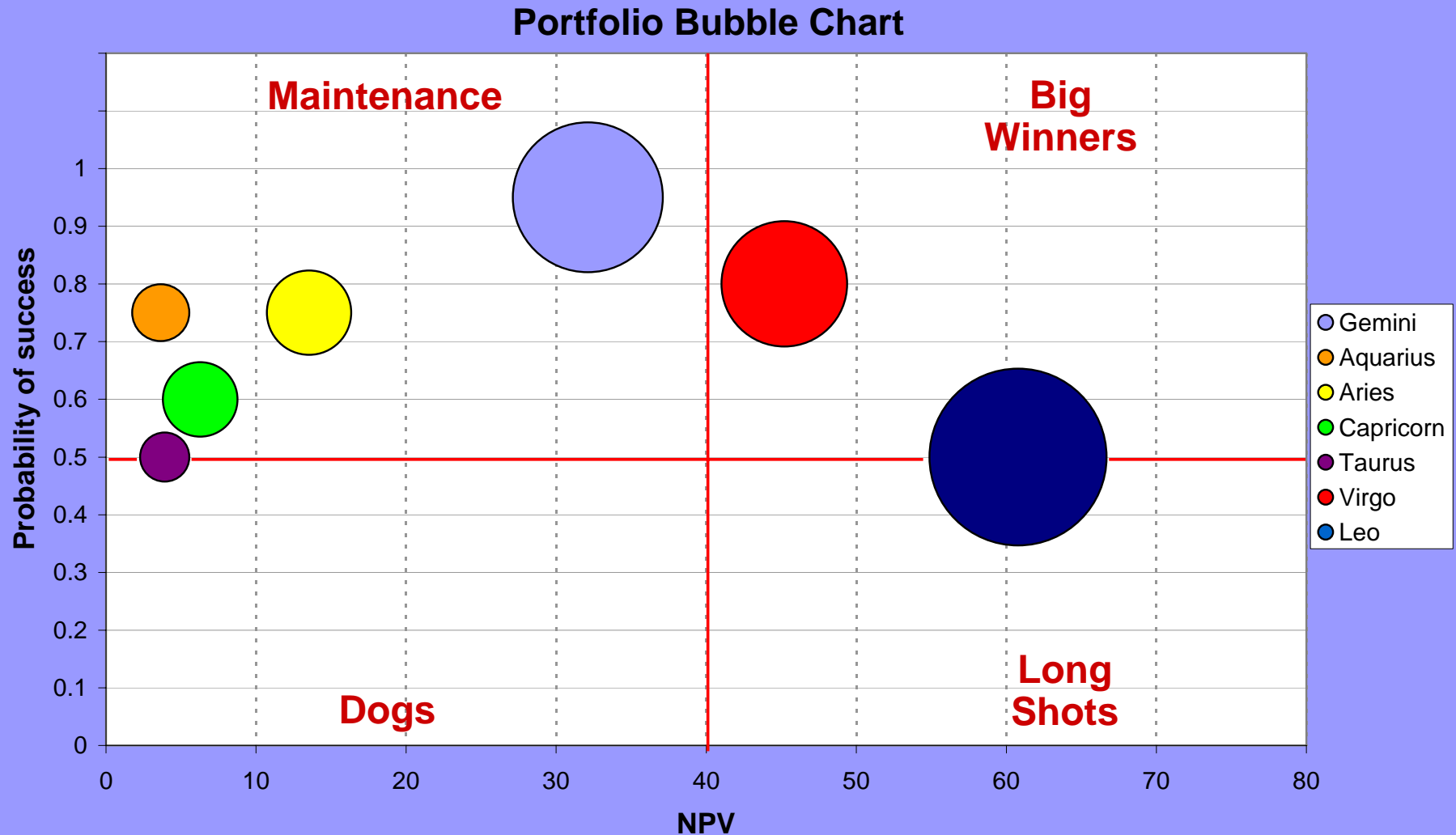
Achieve Balance with Project Mix and Characteristics

- **Profit, financial return**
- **Risk**
- **R&D investment**
- **Sales**



REWARD VS. RISK BUBBLE DIAGRAM

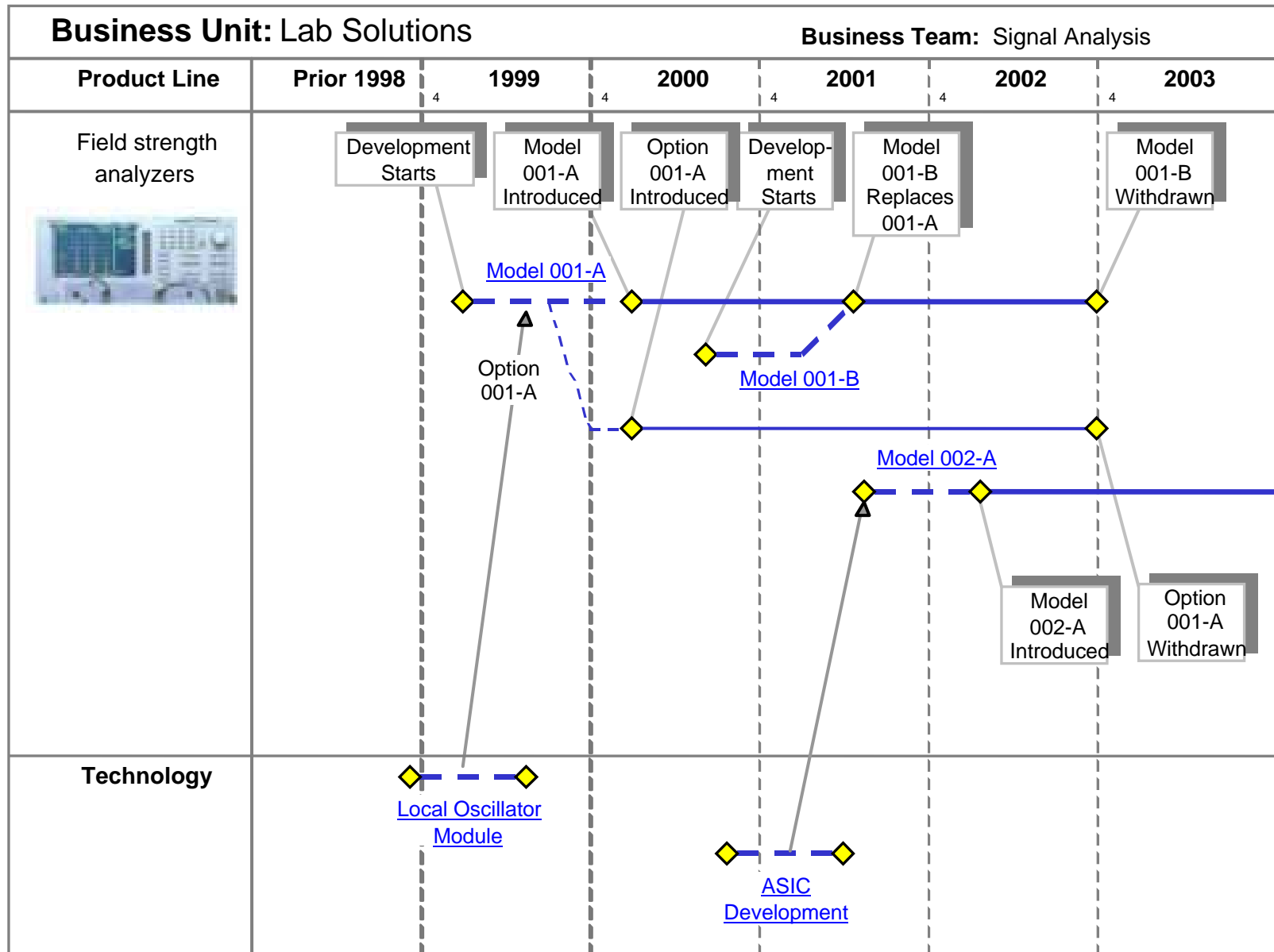
Reward vs. Risk is commonly used to assess balance



PRODUCT ROADMAP METHOD

- Business strategy defines goals & strategic arenas
- Determine what major initiatives must be done to win in each arena
- Determine types of platforms and technologies to invest in:
 - Research & development
 - Technology acquisition
- Cluster projects and identify logical development sequence; consider market opportunity, competition, technology development timing, etc.
- Describe via a Product / Technology Roadmap
- Check the roadmap against the portfolio plan to identify any prerequisite projects that were killed or placed on hold

PRODUCT ROADMAP EXAMPLE



BALANCE PORTFOLIO AGAINST RESOURCES

Assess whether sufficient resources are available to undertake planned portfolio projects

Portfolio Plan

			PROJECT METRICS						
PROJECT NAME	Status	Current phase	BU/product line	Project leader	Project expense	Sales over life	NPV	DPI	Score
Project Description / Project Milestone	Next review date	Next review type	Process name	Marketing lead	Expense remaining	Profit over life	R-factor	Prob of success	Duration
Pluto Turbo charger life extension	Active	Development	Automotive	John Harris	\$313,170	\$1,550,000	\$211,438	1	85
	4-Mar-07	R-Date	Maintenance		\$163,170	\$640,000	2.0	90%	9 months
Andromeda Portfolio management software	Proposed	Proposed	Software	Andy Nichol	\$178,115	\$8,495,000	\$2,268,619	8	83
	1-Apr-07	Start	Refined Software	Bill Sharp	\$178,115	\$5,149,250	28.9	80%	13 months
Gemini High efficiency compressor	Active	Development	Industrial	Mike Brown	\$742,212	\$14,400,000	\$3,469,558	12	81
	6-Dec-06	P-Date	Feasibility/Concept	Tom Wright	\$146,538	\$5,568,000	7.5	50%	14 months
Leo Next generation, high capacity hard drive	Proposed	Proposed	Technology	Brian Walker	\$1,219,710	\$16,200,000	\$3,295,242	2	80
	1-Feb-07	Start	New Product		\$1,214,710	\$5,050,000	4.8	80%	25 months
Virgo DWDM optical power meter	Active	Development	Technology	Ken Black	\$2,704,731	\$45,623,116	\$3,252,963	2	77
	2-May-07	Update	New Product	Tom Wright	\$997,605	\$8,404,044	3.1	70%	25 months
Taurus Fuel tank leak detection system	Proposed	Proposed	Industrial	Mike Brown	\$1,362,210	\$36,000,000	\$3,765,607	2	70
	1-Apr-07	Start	New Product		\$1,362,210	\$7,400,000	5.4	60%	20 months
Arctus 3.5L V8 enhancement	Active	Feasibility	Automotive	Frank Smith	\$1,145,625	\$15,750,000	\$5,074,857	4	65
	19-Feb-07	D-Date	Feasibility/Concept	Bill Sharp	\$990,021	\$8,158,500	7.1	75%	20 months
Andromeda High power compressor	Active	Pilot launch	Industrial	Mike Brown	\$290,101	\$3,150,000	\$679,104	13	55
	2-Nov-06	P-Date	Feasibility/Concept	Tom Wright	\$48,387	\$1,218,000	4.2	95%	10 months
Saturn Enhanced Equities Trading Sys	Proposed	Proposed	Software	Philip Sparaco	\$5,126,154	\$125,000,000	\$5,961,171	1	
			New Services	Eric Motiel	\$5,126,154	\$16,340,000	3.2	75%	18 months
Virtual Technologies Post-processing audio enhance	Proposed	Definition	Consumer	David Tan	\$2,187,265	\$10,200,000	\$2,430,946	1	
			RFI New Product	Sharon Fateman	\$2,116,280	\$7,715,000	3.5	75%	19 months

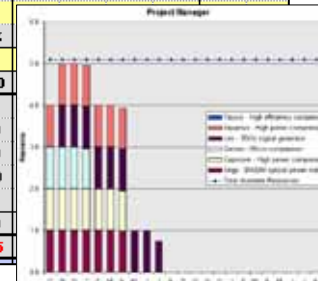
No – Adjust portfolio

Resources Available?

Yes - Continue

Resource Plan

	2005									
	Mar					Apr				
	1	8	15	22	29	5	12	19	26	3
Resources By Type										
Software engineer										
Base headcount	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Δ headcount (new hires, staff reduction)	0.0	0.0	0.0	0.0	0.0					
Availability factor	90%	90%	90%	90%	90%					
Contractors, temps	0.0	0.0	0.0	0.0	0.0					
Total resource availability	4.50	4.50	4.50	4.50	4.50					
Gemini - High efficiency compressor	1.50	1.50	1.50	1.36	.50					
Taurus - Fuel tank leak detection system	1.00	1.00	1.00	1.00	1.00					
Virgo - DWDM optical power meter	1.00	1.00	1.00	1.00	1.00					
Capricorn - DSP measurement engine	2.00	2.00	2.00	2.00	2.00					
Leo - Next generation, high capacity hard drive					.50					
Total Project Demand	5.5	5.5	5.5	5.4	5.0					
+Availability/-Shortage	-1.0	-1.0	-1.0	-0.9	-0.5					



BUSINESS PLANNING INTEGRATION

Annual/
5 Year
Business
Plan

R&D Budget
R&D Headcount
Sales from New Products
Profit from New Products

Project Portfolio

Adjust Plan
Adjust Portfolio

			PROJECT METRICS						
PROJECT NAME	Status	Current phase	Subproduct line	Project leader	Project expense	Sales over life	NPV	DPI	Score
Project Description / Project Milestone	Next review date	Next review type	Process name	Marketing lead	Expense remaining	Profit over life	R-factor	Prob of success	Duration
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Labs	Proposed	Proposed	Technology	Brian Walker	\$1,219,710	\$16,200,000	\$3,295,242	2	80
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Aries	Active	Feasibility	Automotive	Frank Smith	\$1,145,625	\$15,750,000	\$5,074,857	4	65
3.5L V8 enhancement	19-Feb-07	D-Gate	Feasibility/Concept	Bill Sharp	\$990,021	\$8,158,500	7.1	75%	20 months
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Saturn	Proposed	Proposed	Software	Philip Spavino	\$5,126,154	\$128,888,000	\$5,561,171	1	
Enhanced Equities Trading Sys			New Services	Eric Motell	\$5,126,154	\$16,340,000	3.2	75%	18 months
Virtual Technologies	Proposed	Definition	Consumer	David Tan	\$2,167,385	\$10,200,000	\$2,438,945	1	
Post-processing audio enhance.			DPI New Product	Sharon Faltens	\$2,118,298	\$7,715,000	3.9	75%	19 months

Meet Plan?

No

Yes
Stop

Portfolio Business Summary

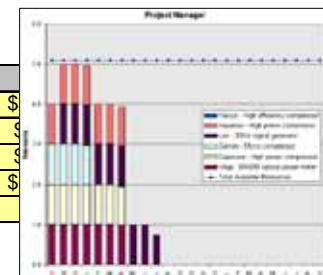
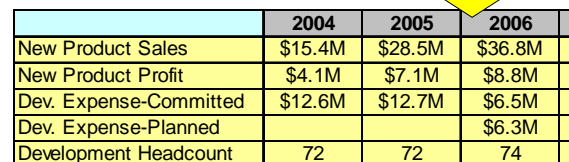
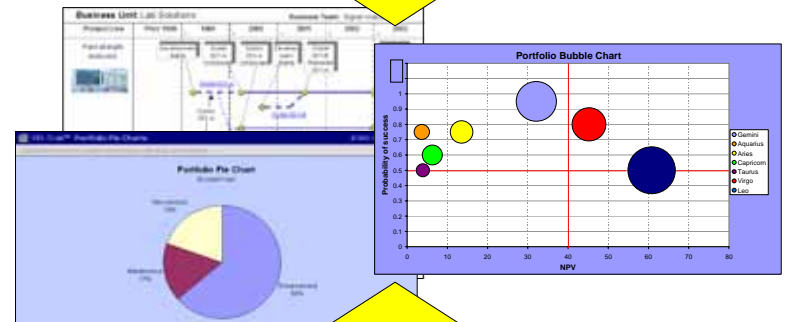
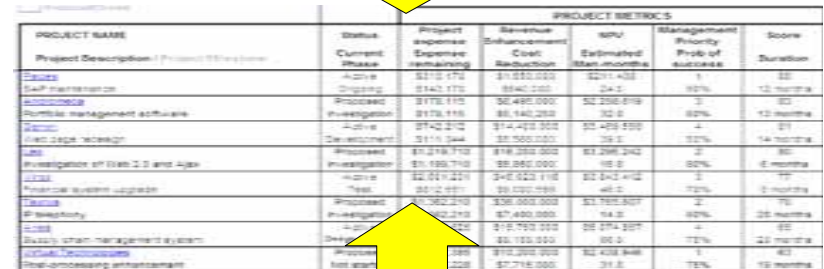
	2004	2005	2006	2007	2008
New Product Sales	\$15.4M	\$28.5M	\$36.8M	\$37.2M	\$31.2M
New Product Profit	\$4.1M	\$7.1M	\$8.8M	\$9.0M	\$7.6M
Dev. Expense-Committed	\$12.6M	\$12.7M	\$6.5M	\$0.0M	\$0.0M
Dev. Expense-Planned			\$6.3M	\$13.4M	\$13.7M
Development Headcount	72	72	74	74	76

RECOMMENDED APPROACH

Four step process:

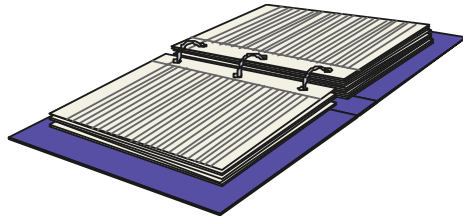
1. How should we spend our R&D budget in terms of markets, business units, product lines, & development categories?
2. Which projects should we undertake & what are the priorities?
3. Does this prioritization achieve the desired balance and address technology & platform prerequisites?
4. Can we accomplish these projects with our resources and meet business goals?

	Technology Development	New Products	Enhancements & Line Exten.	TOTAL
Business Unit A	7%	24%	4%	35%
Business Unit B	2%	16%	7%	25%
Business Unit C	0%	6%	11%	17%
Business Unit D	2%	14%	6%	22%
TOTAL	11%	60%	28%	99%



A TOTAL MANAGEMENT SYSTEM

Business Plan

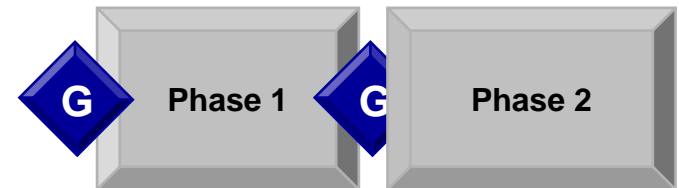


1. Decision on the overall level of investment in R&D and the general product development strategy

2. A solid business case and strategy for each proposed development project



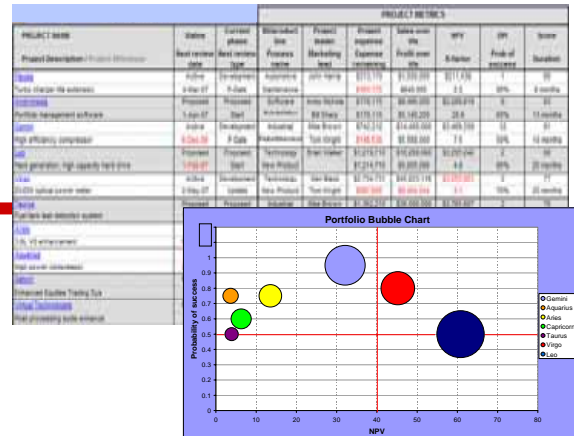
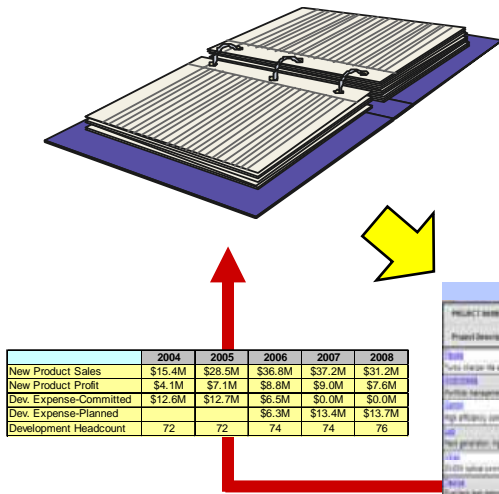
3. A Gate Review process to rigorously evaluate projects at critical points and approve or kill projects



A TOTAL MANAGEMENT SYSTEM

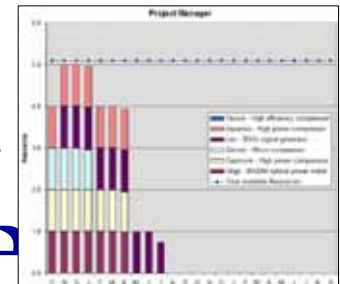
Business Plan

6. An integrated business planning process that shows the result of portfolio decisions on the plan



5. A pipeline management process to plan resource requirements and control the release of development projects

4. A portfolio management process to select an optimum mix of projects that will meet business objectives



PORTFOLIO MANAGEMENT SERVICES

Business & Process Assessment

- Assess the current management and development process, gather data, and determine business requirements

Training and Planning

- Conduct Portfolio Management Workshop to review portfolio management practices and make decisions

Portfolio Management Process

- Assist in establishing the process and supporting metrics and spreadsheets/tools/system

Portfolio Management Facilitation

- Facilitate executive management portfolio planning

Portfolio Management System

- Develop/select system tools for portfolio management

PORTFOLIO MGMT. WORKSHOP AGENDA

- Portfolio Management Objectives
 - Maximize the value of the portfolio
 - Seek balance in the portfolio
 - Keep portfolio projects strategically aligned
- Portfolio Management Methods
 - Strategic allocation
 - Project prioritization with financial metrics
 - Project prioritization with scoring
 - Achieving balance and the right mix with bubble charts and pie charts
 - System roadmaps to check integrity of plans
- Checking the Viability of the Portfolio with Resource Planning
- Checking that Business Goals are Met with the Portfolio

- Portfolio Management Process
- Portfolio Management Decisions to Be Made
 - How is the overall level of investment determined? How is this funding allocated to the business units?
 - Is management going to plan one overall portfolio across all business units or is the planning done unit by unit?
 - How frequently is the portfolio planning going to be done?
 - Who is involved in the portfolio planning?
 - What criteria and methods are going to be used as the basis for prioritizing projects?
 - What tools are needed for portfolio management?