

# CONNECT FAX

**Date** *October 9, 1997*

**Copy Mailed** *YES* ☐ *NO* ☒

**Number of pages including cover sheet** *10*

**TO:**

*Jason Anderson  
595-5305*

**FROM:**

*Lisa Reynolds  
UCSD CONNECT  
Mail Code 0176  
La Jolla, CA 92093*

**Phone** *619/534-6114*

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**CC:**

**REMARKS:**

☐ *Urgent*

☒ *For your review*

☐ *Reply ASAP*

☐ *Please Comment*

Jason -

Attached is the letter from Bill I referenced in my voice mail. He is out of the country for the month of October, and has asked if you would please respond to him via email. His account is "ottersonb@aol.com."

Thanks much, and I look forward to talking with you again soon.





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*The UCSD Program in Technology and Entrepreneurship*

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October 1, 1997

Jason M. Anderson  
Associate Research Analyst  
SANDAG  
401 B Street, Suite 800  
San Diego, CA 92101-4231

Subject: Engineering Recruiting

Dear Jason:

Thank you for your letter of August 12 with your response to my queries on the economic impact of additional engineering jobs in San Diego. With attribution, I have used them widely.

Now, I would like to do two things:

1. Give you updated numbers from our survey:

Attached is our latest summary, showing over 2600 engineering jobs.

2. Ask you to help me understand the figures, based upon the following assumptions:

1. Our 1997 survey covers only two quarters. Our 1995 survey covered eight quarters. The 1997 survey showed that the need is a continuing one, not just a one-time blip.
2. Our survey showed engineering jobs plus other senior jobs that are not strictly engineering jobs. We did not ask for jobs that would support the engineering jobs. The "others" are just that, "What other job openings do you have at this time?" I don't know if they include production jobs, for example.
3. The American Electronic Association produces an "Operating Ratios Survey" study each year. This is a study of their membership, which is largely made up of high-tech, electronics companies. In last years, according to Erik Bruvold, Executive Director, AEA San Diego Council, engineers make up, on average, 20.3% of total employment of high-tech companies. This would mean that non-engineers make up the other 79.7%. These other jobs are in Sales and Marketing, Administration, Accounting and Manufacturing.
4. Engineers are only hired if the company believes that market conditions require more new products or expanded support of existing products. They are not hired to see if they can come up with a product that someone might buy. When you hire an engineer, you must also hire a technician, purchasing, fabrication person, etc., etc., to support the product the engineer designs.

5. The “time-to-market” today of high-tech products (like the “Q” phone) is very short. It is NOT like biotech products that require FDA approval. Manufacturing follows engineering design in a year - not 8-10 years.

6. The same AEA Benchmark study quotes average revenue per person in a high-tech company as \$168,500. This is per “employee”, NOT per engineer. This number will yield the company’s total sales expectations, if you convert engineers to total employees. You can do that by dividing the number of engineers by .203, the percentage of total employees that are engineers. If you take our 2600 engineers and divide by .206, you get total employment of 12,621 (note the one-year trailing because of “tie to market” - you don’t need the production workers until the product is ready to ship, a year later. If you multiply the total number of employees by \$168,500, you get the expected total sales revenues to be produced by the added engineers. This is 12,621 X \$168,500 or \$2.1 billion.

7. Ergo, we could be bringing in the equivalent of two billion dollar companies every six months!

Is that logic sound? I used Overland Data Products, a San Diego company in which I am a major investor and on whose Board I sit, as a comparison. ODI currently employs about 200 people and has about 40 (Mas or menos - I need to re-confirm) engineers. Their revenues are about \$60 million per annum. Their revenue per employee is \$60 million divided by 200 employees, or \$300,000 per employee - twice the AEA average. If ODI were a million in revenues and maintained the same productivity, they would have 16.6 times as many employees, or 3,300. If all San Diego high-tech companies are as productive as ODI, 12,621 employees would yield a \$3 billion company - close enough for government work.

Did I use two short a “time-to-market” delay factor? Our survey covers 50+ companies. Do 50+ companies, with a combined employment of 12,621, act the same as two billion dollar companies? Do they need the same space? Buy the same new houses, Create the same taxes? Support the symphony the same way? Do their employees buy the same products and create the same sales taxes, and pay the same income taxes, etc.

By including SPAWAR and UCSD in our survey, we are causing a bit of a distortion, because they do not manufacture much themselves in the same manner as does a Qualcomm. Additionally, some of the companies may design products here and manufacture them in Southeast Asia. But that could also be true of our hypothetical “billion dollar company”.

All of this says, San Diego has one helluva opportunity! But, I’m looking for a “one liner” that will explain our opportunity to the community. San Diego has been seeking “Fortune 500 companies”, because people think they bring magical

financial support to the community. Wouldn't we rather have 50 companies that do the same thing, but spread the risk? HELP!

Bill

**UCSD CONNECT**  
**1997 Engineering Recruiting Survey**

**CONFIDENTIAL** 10/9/97

#		SUM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
COMPANY		SUM:	Qualcomm	Spawar	UCSD	Cymer	GDE Systems Inc.	Sony Technology Center-San Di	Cubic Corporation	SAIC*	REMEC, Inc.	Hewlett-Packard	TRW	General Atomics & Affiliates	Solar Turbines	Uniden	Rockwell Semiconductor Syste	ENCAD	Alaris Medical Systems, Inc.	Sony Wireless Telecommunicatio	Chemtronics	LG InfoComm, Inc.	General Instruments	Agouron Pharmaceuticals	ComStream**	Denaco Wireless	Doctor Design Corp.	Pulse Engineering	Booz-Allen & Hamilton, Inc.	Leading Edge Eng. (HireTech)
Software Engineers	Q3	600	50	150	30	10	124	10	15	25	2	15	0	5	12	30	4	10	6	11	0	10	10	4	5	5	8	0	10	3
	Q4	615	60	150	22	10	45	10	15	26	1	20	60	10	7	30	4	8	6	11	0	10	10	2	5	5	8	1	10	3
	97	1,215	110	300	52	20	169	20	30	51	3	35	60	15	19	60	8	18	12	22	0	20	20	6	10	10	16	1	20	6
Hardware Engineers	Q3	290	25	0	7	10	9	15	20	13	1	10	0	5	20	15	30	12	3	14	0	10	3	0	7	15	8	9	2	2
	Q4	364	30	0	3	10	2	10	40	12	1	20	67	10	15	15	30	15	2	14	0	10	3	0	7	10	8	2	2	2
	97	654	55	0	10	20	11	25	60	25	2	30	67	15	35	30	60	27	5	28	0	20	6	0	14	25	16	11	4	4
other types of Engineers	Q3	421	25	100	2	30	45	10	15	25	6	20	0	12	5	5	10	5	1	10	5	10	2	0	3	3	0	15	10	7
	Q4	392	30	50	0	70	15	10	15	26	3	20	2	50	3	5	10	5	1	0	4	10	2	0	3	3	0	2	10	7
	97	813	55	150	2	100	60	20	30	51	9	40	2	62	8	10	20	10	2	10	9	20	4	0	6	6	0	17	20	14
Engineering Management Pos.	Q3	129	5	30	5	5	4	2	5	10	1	10	0	10	0	3	1	2	1	0	3	0	1	1	2	2	4	3	0	3
	Q4	120	10	30	1	6	0	4	5	10	1	12	3	10	0	3	1	1	0	0	0	1	1	2	0	2	1	0	3	
	97	249	15	60	6	11	4	6	10	20	2	22	3	20	0	6	2	3	1	0	3	0	2	2	4	2	6	4	0	6
Total Engineering Pos.	Q3	1,440	105	280	44	55	182	37	55	73	10	55	0	32	37	53	45	29	11	35	8	30	16	5	17	25	20	27	22	15
	Q4	1,491	130	230	26	96	62	34	75	74	6	72	132	80	25	53	45	29	9	25	4	30	16	3	17	18	18	6	22	15
	97	2,931	235	510	70	151	244	71	130	147	16	127	132	112	62	106	90	58	20	60	12	60	32	8	34	43	38	33	44	30
Marketing and Sales Pos.	Q3	203	50	0	7	0	0	0	5	0	1	12	0	0	12	5	2	4	15	7	0	0	5	15	4	3	2	4	0	2
	Q4	190	65	0	0	0	0	2	5	0	0	10	0	1	20	5	2	2	4	7	0	0	5	11	4	1	2	3	0	2
	97	393	115	0	7	0	0	2	10	0	1	22	0	1	32	10	4	6	19	14	0	0	10	26	8	4	4	7	0	4
Finance and Accounting Pos.	Q3	140	50	0	25	5	1	5	7	3	1	5	0	1	4	0	0	3	7	3	1	0	4	3	3	0	1	0	0	0
	Q4	141	65	0	20	5	1	3	5	3	1	5	2	2	3	0	0	3	3	0	1	0	2	2	3	1	0	1	0	0
	97	281	115	0	45	10	2	8	12	6	2	10	2	3	7	0	0	6	10	3	2	0	6	5	6	1	1	1	0	0
General Administrative and Support	Q3	523	40	50	270	5	13	12	10	23	20	10	0	0	3	2	3	2	8	1	2	2	3	12	3	2	3	1	0	0
	Q4	443	50	30	225	5	2	10	10	24	10	5	8	5	2	2	3	1	6	0	2	2	3	3	3	0	0	3	0	0
	97	966	90	80	495	10	15	22	20	47	30	15	8	5	5	4	6	3	14	1	4	4	6	15	6	2	3	4	0	0
Manufacturing Positions	Q3	526	100	15	0	80	0	75	10	0	88	0	0	10	26	1	0	6	13	0	40	0	5	5	4	0	0	0	0	5
	Q4	854	500	20	0	80	0	75	50	0	40	0	2	10	0	1	0	6	5	0	10	0	4	4	4	0	0	0	0	5
	97	1,380	600	35	0	160	0	150	60	0	128	0	2	20	26	2	0	12	18	0	50	0	9	9	8	0	0	0	0	10
Total Positions	Q3	2,832	345	345	346	145	196	129	87	99	120	82	0	43	82	61	50	44	54	46	51	32	33	40	31	30	26	32	22	22
	Q4	3,119	810	280	271	186	65	124	145	101	57	92	144	98	50	61	50	41	27	32	17	32	30	23	31	20	20	13	22	22
	97	5,951	1,155	625	617	331	261	253	232	200	177	174	144	141	132	122	100	85	81	78	68	64	63	63	62	50	46	45	44	44
Positions need to be in San Diego:	Q3	2,649	345	350	346	130	160	129	87	100	100	82	0	20	54	61	46	44	40	36	51	32	32	36	25	30	26	27	22	21
	Q4	2,906	810	280	271	160	25	124	145	100	50	92	144	22	45	61	46	41	25	27	17	32	29	14	25	20	20	13	22	21
	97	5,555	1,155	630	617	290	185	253	232	200	150	174	144	42	99	122	92	85	65	63	68	64	61	50	50	50	46	40	44	42
No. of Employees		60,999	7,500	4,500	14,000	650	1,848	4,000	1,520	2,400	1,357	2,100	500	1,200	5,100	180	700	500	1,100	270	750	48	835	725	425	63	89	200	110	3
No. of Engineers		16,815	3,000	3,600	1,000	585	939	450	458	1,870	95	1,200	N/A	500	300	150	460	150	150	140	90	39	309	2	120	49	48	90	80	2
Current openings/all fields		3,931	800	235	300	300	212	150	115	200	164	170	144	90	90	50	92	55	70	70	60	30	83	75	31	20	18	31	N/A	17

Source: UCSD CONNECT  
0176F, La Jolla, CA 92037

**UCSD CONNECT**  
**1997 Engineering Recruiting Survey**

**CONFIDENTIAL** 10/9/97

#	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47		48	49	50	51	52	53	54	55	56	57	58	59
COMPANY	Kyocera America, Inc.	Digirad	Kokusai Communications	Clincomp International, Inc.	FNC Software Inc.	AMCC	UNISYS	SCS Corp.	GreyStone Technology	Jabra Corp.	GTE Moblinet	GTE Wireless	Expertsoft	Symitar Systems	Torrey Science Corp.	Space Electronics Inc.	i-Bus	The Lightspan Partnership	Allied Signal Inc./Electron Vision	Stac, Inc.	Akros Biomedical	SDG&E	Kaiser Electro Optics	Sierracraft/Magnadyne	Genset	PRISA Networks	Predicrete Logic, Inc.	Columbus Research, Inc.	Petlicular Systems Inc.	Citrisoft	DepoTech	San Diego Data Processing
Software Engineers	0	0	5	6	4	0	0	1	7	0	0	1	3	2	3	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0
	0	0	5	10	15	0	0	2	10	1	0	2	4	4	3	0	0	0	1	1	0	1	2	0	0	1	1	1	1	1	0	0
	0	0	10	16	19	0	0	3	17	1	0	3	7	6	6	0	1	0	2	1	0	1	3	0	0	1	1	1	2	1	0	0
Hardware Engineers	0	3	5	0	0	0	1	0	0	3	0	1	0	2	2	0	3	0	1	2	0	0	2	0	0	0	0	0	0	0	0	0
	0	6	1	2	0	0	1	0	0	2	0	1	0	3	2	0	0	0	1	2	0	0	1	0	0	1	1	0	0	0	0	0
	0	9	6	2	0	0	2	0	0	5	0	2	0	5	4	0	3	0	2	4	0	0	3	0	0	1	1	0	0	0	0	0
other types of Engineers	4	1	9	1	2	5	1	2	1	1	3	0	0	0	0	3	1	0	0	0	2	1	0	1	0	2	0	0	0	0	0	0
	10	1	5	2	2	5	1	2	0	1	3	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
	14	2	14	3	4	10	2	4	1	2	6	0	0	0	0	3	1	0	0	0	4	3	0	1	0	2	0	0	0	0	0	0
Engineering Management Pos.	2	2	0	1	2	1	0	0	0	0	0	0	2	0	1	1	1	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0
	2	1	0	0	2	1	0	1	2	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0
	4	3	0	1	4	2	0	1	2	0	0	0	3	0	1	1	1	0	0	0	2	0	0	1	0	0	2	1	0	0	0	0
Total Engineering Pos.	6	6	19	8	8	6	2	3	8	4	3	2	5	4	6	4	6	0	2	2	3	1	3	2	0	2	1	0	1	0	0	0
	12	8	11	14	19	6	2	5	12	4	3	3	5	7	5	0	0	0	2	3	3	3	3	0	0	2	3	2	1	1	0	0
	18	14	30	22	27	12	4	8	20	8	6	5	10	11	11	4	6	0	4	5	6	4	6	2	0	4	4	2	2	1	0	0
Marketing and Sales Pos.	4	3	0	1	4	6	0	0	0	2	5	2	1	0	0	1	7	6	1	1	0	0	0	2	1	1	0	0	0	0	0	0
	4	8	1	1	0	6	0	0	0	2	5	0	2	0	0	0	0	6	0	1	0	0	1	0	1	0	0	1	0	0	0	0
	8	11	1	2	4	12	0	0	0	4	10	2	3	0	0	1	7	12	1	2	0	0	1	2	2	1	0	1	0	0	0	0
Finance and Accounting Pos.	0	2	0	1	0	0	0	2	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	1	2	2	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	1	4	2	1	0	0	1	3	0	2	0	0	0	1	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
General Administrative and Support	0	1	1	1	0	3	0	1	0	1	0	6	1	2	1	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0
	0	2	3	2	0	3	0	1	0	2	0	3	1	0	1	1	0	0	0	1	0	5	0	0	0	0	1	1	1	1	1	0
	0	3	4	3	0	6	0	2	0	3	0	9	2	2	2	3	0	0	0	1	1	5	0	1	0	0	1	1	1	1	1	0
Manufacturing Positions	7	6	0	3	0	0	10	4	0	1	0	0	0	0	0	4	0	0	3	0	1	0	0	2	2	0	0	0	0	0	0	0
	10	6	0	1	0	0	10	4	0	1	0	0	0	0	0	0	0	0	3	0	1	0	0	0	2	0	0	0	0	0	0	0
	17	12	0	4	0	0	20	8	0	2	0	0	0	0	0	4	0	0	6	0	2	0	0	2	4	0	0	0	0	0	0	0
Total Positions	17	18	20	14	12	15	12	10	8	9	8	10	7	6	7	12	13	6	6	4	5	1	3	7	3	3	1	0	1	0	1	0
	27	26	17	18	19	15	13	11	12	10	8	6	8	8	6	1	0	6	5	5	4	8	5	0	3	2	4	4	2	2	0	0
	44	44	37	32	31	30	25	21	20	19	16	16	15	14	13	13	13	12	11	9	9	9	8	7	6	5	5	4	3	2	1	0
Positions need to be in San Diego:	14	17	20	14	12	11	12	10	8	9	8	10	5	6	7	12	9	4	6	0	5	1	3	7	3	1	1	0	1	0	1	0
	23	20	17	17	19	11	13	11	12	10	8	6	5	8	6	1	0	0	5	0	4	8	5	0	3	2	3	4	2	2	0	0
	37	37	37	31	31	22	25	21	20	19	16	16	10	14	13	13	9	4	11	0	9	9	8	7	6	3	4	4	3	2	1	0
No. of Employees	1,050	53	30	64	233	282	450	30	40	22	260	250	53	190	87	98	150	370	15	155	15	3,800	78	0	25	26	26	5	18	3	148	300
No. of Engineers	80	12	0	20	100	110	45	12	16	5	9	15	28	12	60	23	30	5	7	110	9	150	14	0	0	16	20	3	15	2	6	5
Current openings/all fields	30	17	24	12	26	15	15	0	4	5	5	8	6	10	11	7	13	12	5	5	3	6	2	0	1	3	2	0	0	0	10	2

Source: UCSD CONNECT  
0176F, La Jolla, CA 92037



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- *The UCSD Program in Technology and Entrepreneurship*

**Needs for Technical People in the Second Half of 1997**

10/9/97

<b>Requirements</b>	<b>Q3</b>	<b>Q4</b>	<b>Total</b>
Software Engineers	600	615	<b>1215</b>
Hardware Engineers	290	364	<b>654</b>
Other types of Engineers	421	392	<b>813</b>
Engineering Management	129	120	<b>249</b>
<b>Total Engineering Positions</b>	<b>1440</b>	<b>1491</b>	<b>2931</b>
Marketing and Sales	203	190	<b>393</b>
Finance and Accounting	140	141	<b>281</b>
General Admin. and Support	523	443	<b>966</b>
Manufacturing Positions	526	854	<b>1380</b>
<b>Total Other Positions</b>	<b>1392</b>	<b>1628</b>	<b>3020</b>
<b>Total Positions</b>	<b>2832</b>	<b>3119</b>	<b>5951</b>

**SOURCE: UCSD CONNECT**  
0176F, La Jolla, CA 92037

**CONFIDENTIAL**  
10/9/97

**Ranking Code: 5 = big issue - 1 = not an issue**

\*In the general comments section of the survey many companies mentioned the concern of engineers that San Diego could be a "dead-end" city, with no other opportunities for employment if their first job didn't work out

**SOURCE: UCSD CONNECT**  
0176F, La Jolla, CA 92037





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*- The UCSD Program in Technology and Entrepreneurship*

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### **Issues in the Area of Recruitment**

#### **Top 5 Issues:**

Ranking Code: 5 = big issue - 1 = not an issue

Meeting the financial expectations	4.1
Helping adjust to the cost of living in the state of CA	2.7
Helping the recruits to find affordable housing	2.4
Helping their spouse/partner find employment	2.3
Does relocation package meet their needs?	2.2

San Diego could be a "dead-end" city - was mentioned by many companies

**SOURCE: UCSD CONNECT**  
0176F, La Jolla, CA 92037

<b>Companies Included in Survey</b>
Agouron Pharmaceuticals
Akos Biomedical
Alaris Medical Systems, Inc.
Allied Signal Inc./Electron Vision Gr.
AMCC
Booz-Allen & Hamilton, Inc.
Cafesoft
Chemtronics, Inc.
Clinicomp International, Inc.
Columbus Research, Inc.
ComStream
Cubic Corporation
Cymer
Denso Wireless
DepoTech
Digirad
Doctor Design Corp.
ENCAD
Expertsoft
GDE Systems, Inc.
General Atomics
General Instruments
Genset
GreyStone Technology
GTE Mobilnet
GTE Wireless
Hewlett-Packard
HNC Software
I-Bus
Jabra Corp.
Kaiser Electro Optics
Kokusai Communications
Kyocera America, Inc
Leading Edge Eng. (HireTech)
Lightspan Partnership
LG InfoComm, Inc.
Predicate Logic, Inc.
PRISA Networks
Pulse Engineering
Qualcomm
REMEC, Inc.
Reticular Systems Inc.
Rockwell Semiconductor Systems
SAIC*
San Diego Data Processing
San Diego Gas and Electric
SCS Corp.
Sierracin/Magnedyn
Solar Turbines
Sony Technology Center-San Diego
Sony Wireless Telecommunications
Space Electronics Inc.
Spawar
Stac, Inc.
Symitar Systems
Torrey Science Corp.
TRW
UCSD
Uniden
UNISYS
<b>Total included in the survey: 60</b>
Confidential



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*The UCSD Program in Technology and Entrepreneurship*

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**Memo:**

10/9/97

**To: Joseph E. Bear**  
**UCSD, School of Engineering**

**Phone 619-534-2776**  
**534-7609 SOE**

**Fax 534-4771**

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**From: Lisa Reynolds**  
**Assistant to Bill Otterson**  
**619-534-4750**  
**619-552-0649 (fax)**

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10/9/97

Joe -

Enclosed is the latest update to the CONNECT 1997 Engineering Recruiting Survey. As Bill mentioned in his email, we have promised to keep the information confidential, and the confidential pages are noted as such. I'll follow up with some information in the mail and hand outs for your October 16 meeting.

Thanks,  
Lisa Reynolds  
Assistant to Bill Otterson  
534-4750