



Small Satellites: A Revolution in Space Science

16-20 July 2012, Pasadena, California

Introductions and Goal Setting

Charles Norton, JPL
Sergio Pellegrino, Caltech
Michael Johnson, JA



Outline

- Participant Introductions
- Workshop/study program
 - Objectives
 - Scope
 - Structure
- Suggestions for productive interaction
- End goals of this workshop and the overall study program

Introductions

Vassilis Angelopoulos – UCLA

Manan Arya – Caltech

Julie Castillo-Rogez – JPL

James Cutler – University of Michigan

Dan Erwin – USC

Jason Hyon – JPL

Rebecca Jensen-Clem – MIT

Michael Johnson – JA

Laura Jones – Cornell University

Andrew Klesh – JPL

Janice Lee – Space Telescope Science Inst

Paulett Liewer – JPL

Edgar Lightsey – University of Texas at Austin

Neil Murphy – JPL

Stephen Murray – Johns Hopkins University

Philip Nicholson – Cornell University

Charles Norton – JPL

Sergio Pellegrino – Caltech

Christopher Shaffer – UCLA

Sara Spangelo – University of Michigan

John Springmann – University of Michigan

Robert Staehle – JPL

John Steeves – Caltech

Stephen Unwin – JPL

Austin Williams - Tyvak Nano-Satellite Systems

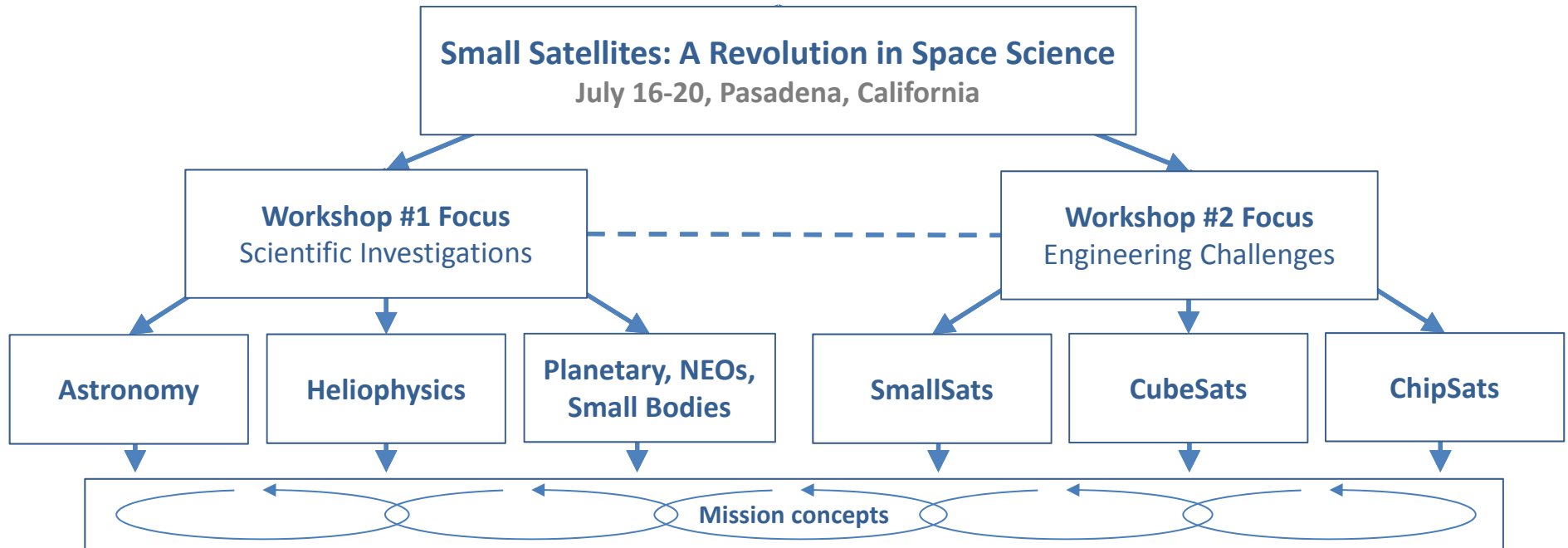
Objectives

- We want to investigate/discuss...
 - Potential astrophysics, heliophysics, and planetary science missions **uniquely** enabled by small satellites
- Our goals are to...
 - Identify new scientific insights achievable from SmallSats
 - Formulate candidate mission(s) for each science focus area
 - Form breakout groups to review and refine each concept
 - Prioritize all of the mission concepts
 - Prepare a report and discuss plans for the 2nd workshop
 - Establish a community to set publishable scientific priorities

Objectives - continued

- A successful outcome of this workshop:
 - Identification of several promising missions
 - Rough understanding of the engineering challenges
 - A plan to refine these concepts with a preliminary report
- A successful outcome at the end of the study program:
 - A set of concepts suitable as a potential SMEX to Discovery-Class missions
 - A Small Satellite Space Science Working Group long-term vision and strategic plan that is relevant and inspirational for the scientific and engineering community

Study Program Scope



- Both workshops in the study program are coupled
 - Discussions are not mutually exclusive, but each workshop will have a primary focus area

A note on SmallSat vs CubeSat vs ChipSat

- SmallSat (< 200 kg, e.g. 180 kg ESPA-class)
 - Multiple LEO and Earth escape missions to date
- CubeSat (1U is 10 cm x 10 cm x 10cm and < 1.3 kg)
 - 1U, 1.5U, 2U and 3U have launched to LEO
 - 6U LEO launches expected in 2013
 - 12U and 24U proposed
 - NPS-CUL (nine 3U P-Pods) first launch in summer 2012
- ChipSat (< 10 g)
 - First launch to LEO expected 2013

Structure of workshop

- Discussion sessions (usually) consist of:
 - Lead in talk (30-45 minutes)
 - Moderated discussion (60 minutes)
 - Multiple breakout groups (60 minutes)
 - Multiple breaks and meals to continue discussions
- Volunteers will take notes in each session (thank you!)
- We have room to make adjustments in our agenda, expand or change discussion topics

Guidelines/suggestions

- Productive discussion is key to our success
- Take risks to explore “out-of-the-box” ideas
- If we are discussing a moot point, or violating the laws of physics, help us understand why and to get back on point
- Everyone here is part of our core group so ask questions, stay engaged, and participate in the discussions for everyone’s benefit

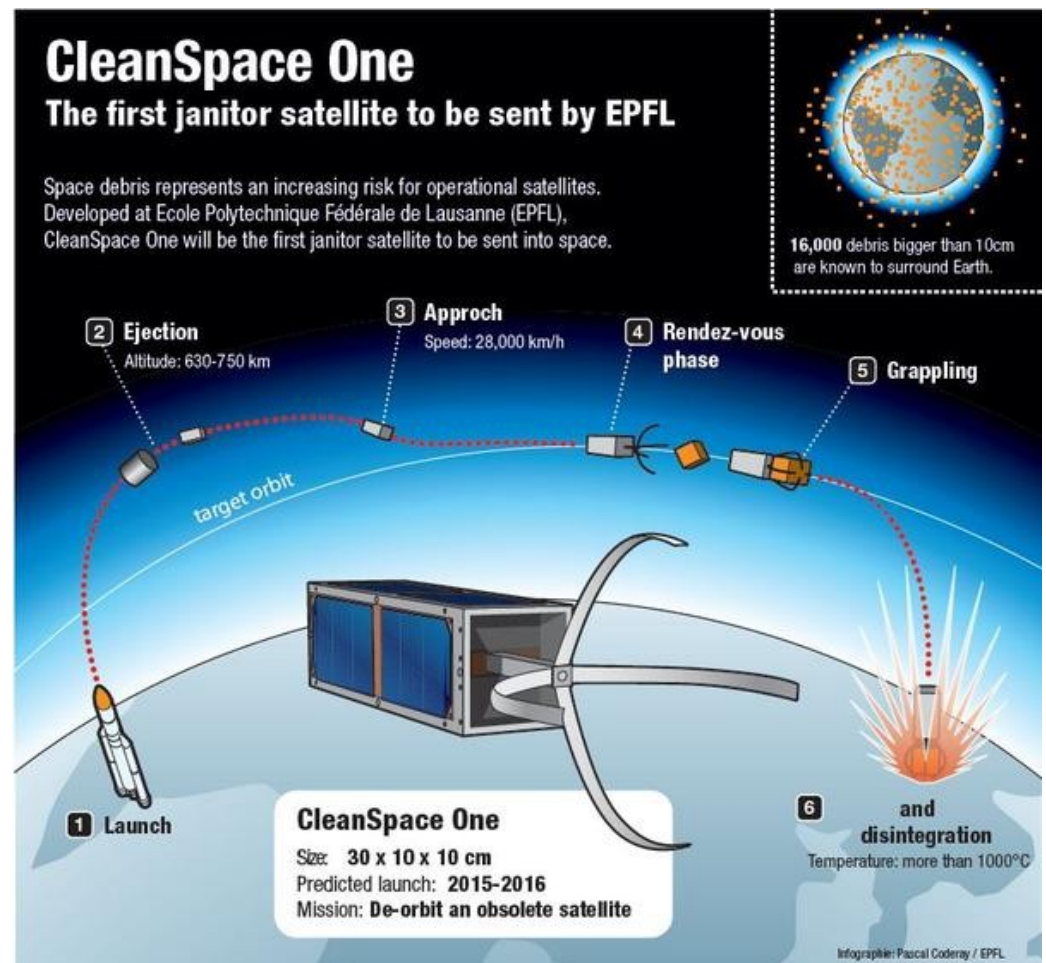
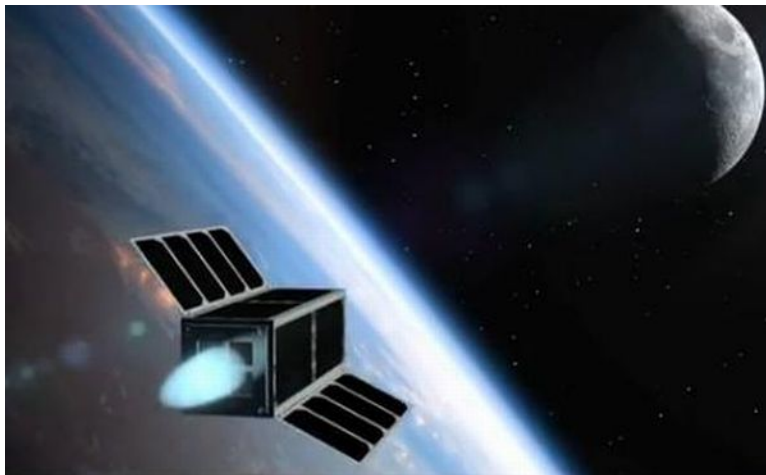
Post Workshop Visit to JPL

If you wish to visit JPL
on Friday afternoon
please let me know
during dinner tonight
You will need photo
identification with
additional items if you
are a foreign national



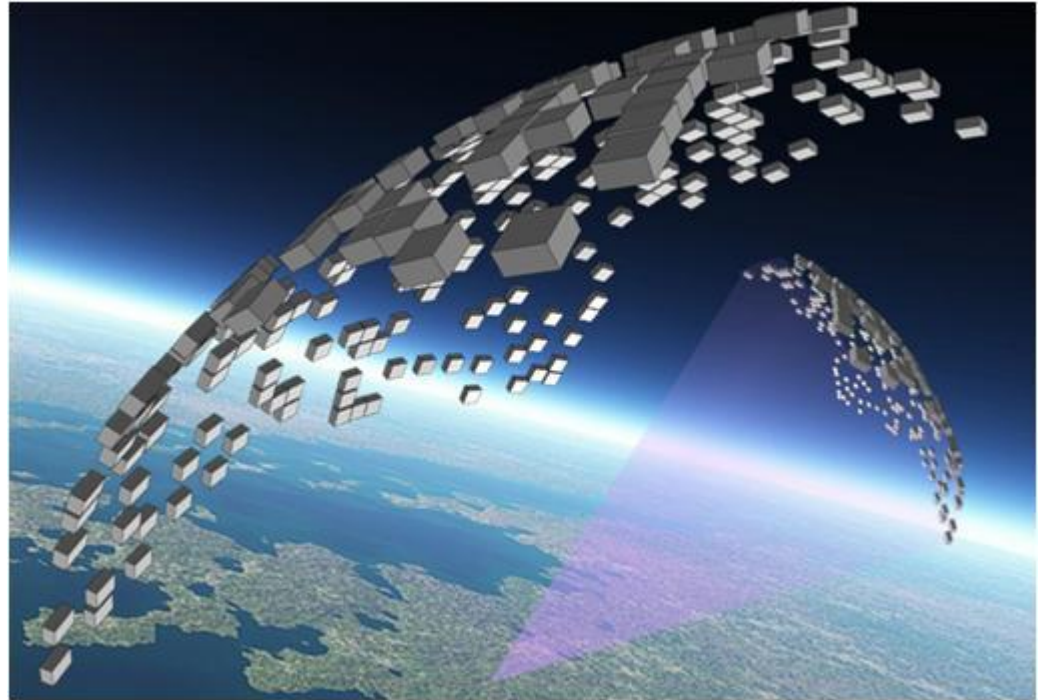
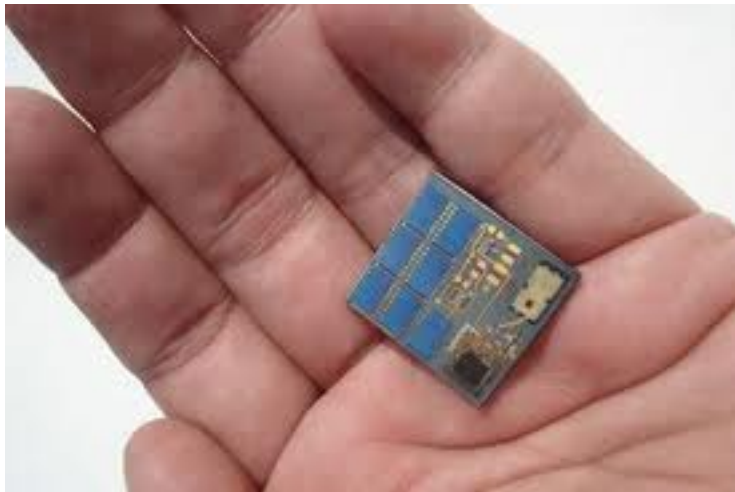
Motivational Dinner Thoughts

What new technologies can enable a revolutionary mission?



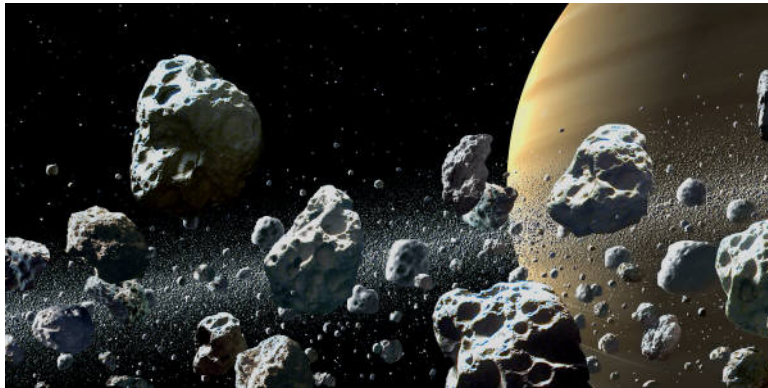
Motivational Dinner Thoughts

Can numerous and/or perhaps disposable, SmallSats open a pathway to new science?



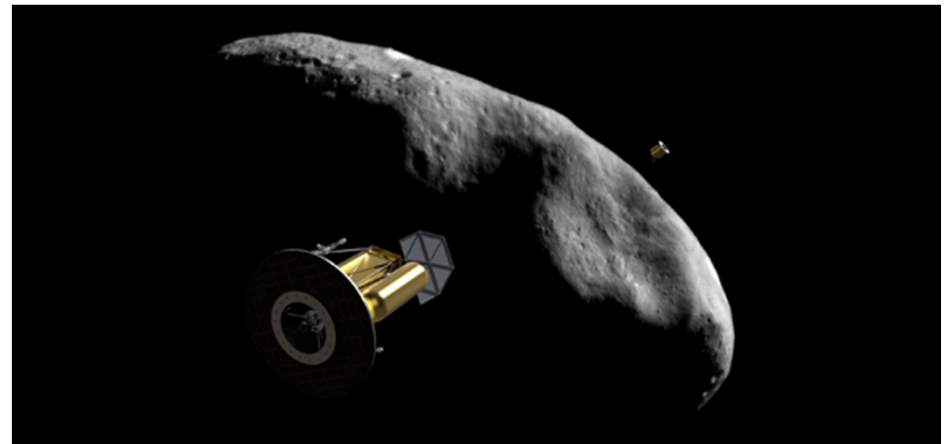
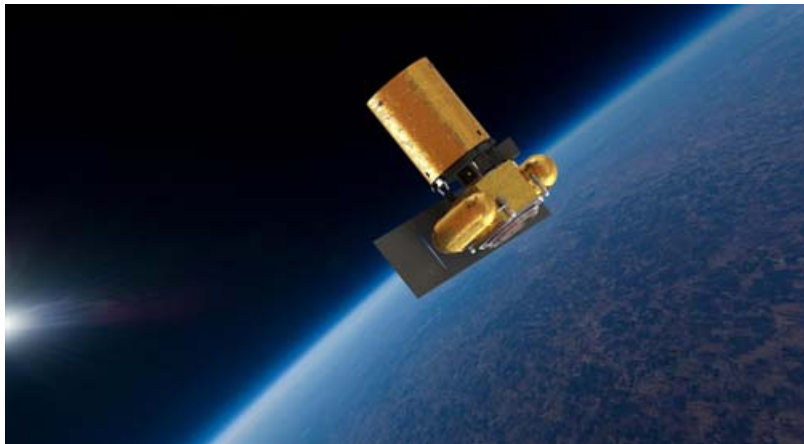
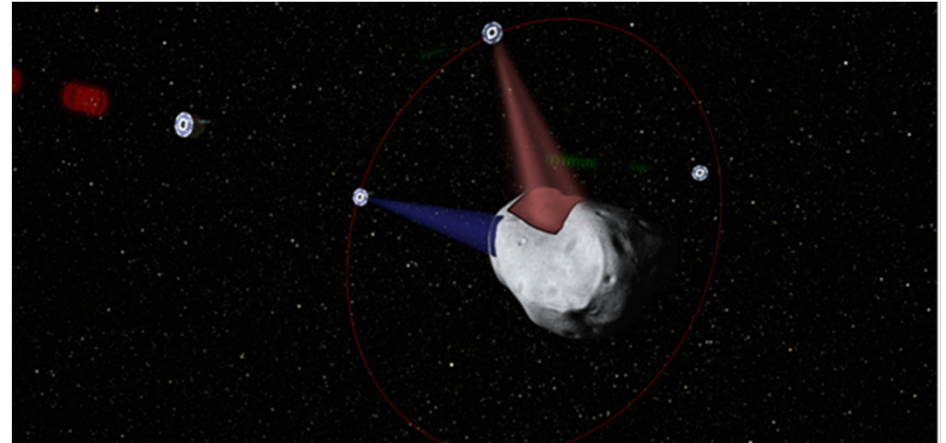
Motivational Dinner Thoughts

Are there scientific questions that can only be answered with small spacecraft?



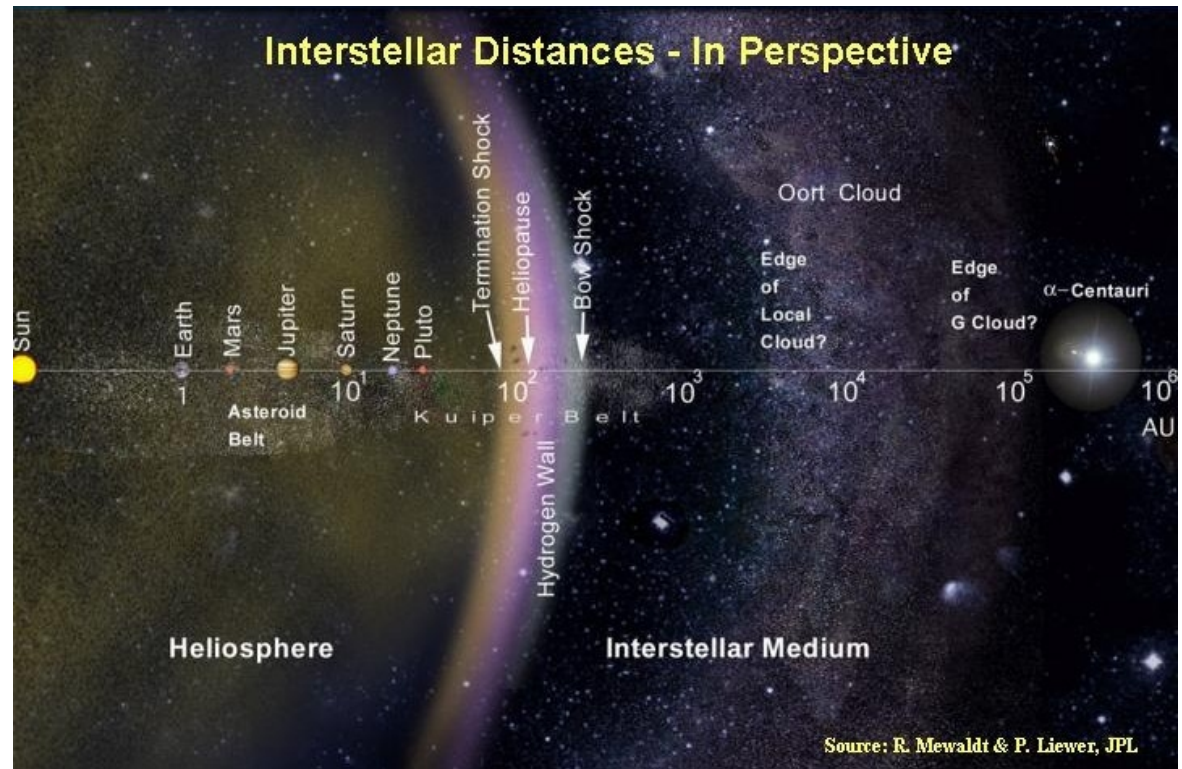
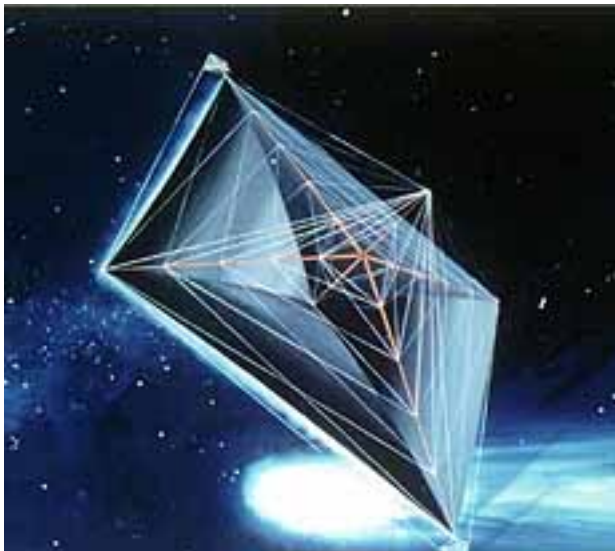
Motivational Dinner Thoughts

Can private industry have a role in revolutionary space science?



Motivational Dinner Thoughts

How far, and how deep, can we explore?



“More” Motivational Dinner Thoughts

7:00 pm Tuesday No-Host Dinner
Café Bizou

91 North Raymond Avenue, Pasadena

http://cafebizou.com/home_pas.php



Many menu options exist!

CAFE BIZOU

PRIX FIXED MENU



dinner \$25*

*Prices exclude alcohol, tax and gratuity

First Course Choices

LOBSTER BISQUE or FRENCH ONION SOUP

ASIAN PEAR SALAD

BAKED MUSHROOMS
*Stuffed with chicken and
spinach mousse in
a balsamic Vinegar sauce*

ESCARGOTS PERSILLADE
*half a dozen Burgandy snails,
garlic butter, parsley*

Second Course Choices

GRILLED BUFFALO NY STEAK SALAD
*sliced buffalo NY steak, Burgundy wine sauce, baby mixed green,
watercress, endive, blue cheese, dijon mustard dressing*

LOBSTER, SEA SCALLOP & SHRIMP PASTA
*black tagallini pasta topped with chunks of
lobster, sea scallop & shrimp, tossed with tomatoes and
mushrooms in a lobster sauce*

MACADAMIA NUT CRUSTED WILD WHITE KING SALMON
*With mashed potatoes and vegetables in a
white wine herb sauce*

STEAK, SEA SCALLOP AND JUMBO SHRIMP
*Petit filet mignon, sliced in a brandy cream
sauce with pan seared sea scallop and
jumbo shrimp served with baked potato and grilled tomato*

Third Course Choices

FLOURLESS CHOCOLATE CAKE TIRAMISU TRIO OF SORBET

1ST AND 3RD COURSE MAY BE SUBSTITUTED
WITH A GLASS OF HOUSE WINE



Monday, July 16 - Friday, July 27

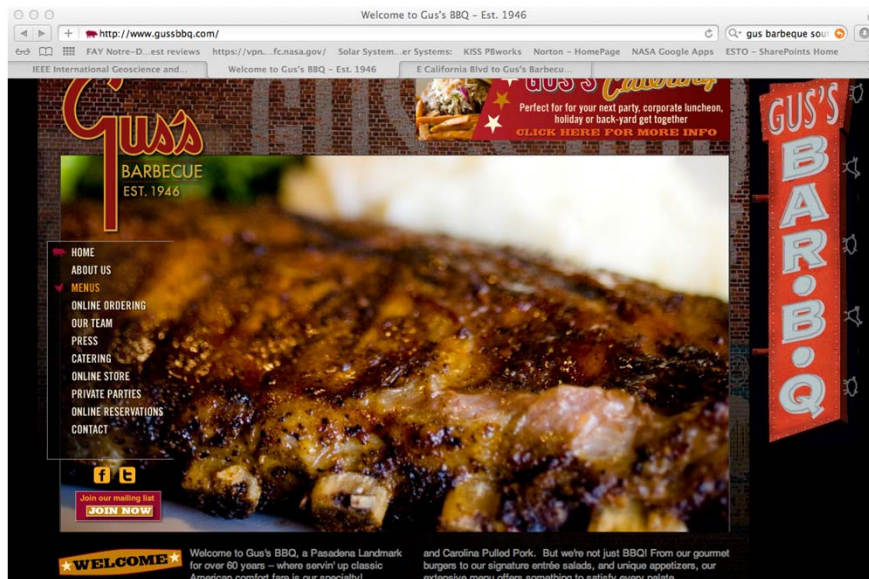
“More” Motivational Dinner Thoughts

6:30 pm Wednesday No-Host Dinner

Gus's Barbecue

808 Fair Oaks Avenue, South Pasadena

<http://www.gussbbq.com>



Many menu options exist!

GUS'S Real Pit BBQ

★ TRADITIONAL BBQ ★

California Style

*Our BBQ is seasoned overnight and then smoked low and slow for up to 16 hours.
We use whole pecan logs in order to create our signature smoke flavor.*

All BBQ specialties come with a choice of two sides:

French Fries • Sweet Potato Fries • Cole Slaw • Braised Southern Greens
BBQ Baked Beans • Louisiana Red Beans & Rice • Dirty Rice • Red Skin Potato Salad
Sugar Snap Peas N' Carrots • Roasted Garlic Mashed Potatoes
Creamed Corn • Mac N' Cheese

Add a House Salad* or Caesar Salad 4.95

Memphis Style Baby Back Ribs

Basted with Gus's Original BBQ Sauce
full rack 25.95 half 19.95

Beer Braised Texas Brisket

Beer Braised and Smoked for up to 16 hours!
16.95

St. Louis Spare Ribs

Basted with Gus's Original BBQ Sauce
full rack 25.95 half 19.95

Carolina Style Pulled Pork

Smoked low and slow with our
Signature Rub **15.95**

BBQ Brick Chicken

Half of a Boneless Chicken Grilled and Basted
in Gus's Original BBQ Sauce **16.95**

Smoked Sausage

Gus's own recipe made by a Smokehouse in Texas!
Two Smoked Beef Sausages Grilled and Basted
with Our Original BBQ Sauce **13.95**

★ GUS'S Combos ★

Ribs & Chicken

Your choice of: Memphis Baby Backs or
St. Louis Spare Ribs and BBQ Brick
Chicken or Southern Fried Chicken **22.95**

Chicken & Two Meat Combo

Your choice of: BBQ Brick Chicken or Southern
Fried Chicken, and two of the following:
Carolina Style Pulled Pork / Beer Braised
Texas Brisket / Smoked Sausage **20.95**

Ribs & Two Meat Combo

Your choice of: Memphis Baby Backs or
St. Louis Spare Ribs, and two of the
following: Carolina Style Pulled Pork /
Beer Braised Texas Brisket /
Smoked Sausage **21.95**

Picnic Platter

Your choice of: Memphis Baby Backs or St. Louis
Spare Ribs, and either BBQ Brick Chicken or
Southern Fried Chicken, and one of the following:
Carolina Style Pulled Pork / Beer Braised Texas
Brisket / Smoked Sausage **26.95**



Next:

6:30 Depart for KISS Dinner at the Athenaeum