Term Project 1 and ENAE 484 Planning

- Lecture #12 – October 5, 2022
- Team assignments for Term Project 1
- Project and specialty assignments for ENAE 484
- Expectations and milestones for ENAE 483

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Teams for Team Project 1

Team 1
Peter Capozzoli
Luca Petrescu
Saimah Siddiqui
Nikkole Merton

Team 2
Gustavo Lang
Ryan Rex
Lucas Armyn
Alexander Teacu
Cameron Patillo

Team 3
Florian Grader-Beck
Kuds Desta
Henri Roviera
Chibueze Amos-Uhegbu

Team 4
Evan Ramm
Karan Rai
Nathaniel McIntyre
Dmitri Kontchaev
Stephen McGowan

Team 5
Joshua Gehres
Caleb Hoffman
Adam Lahr
Julia Joseph

Team 6
Aroni Gupta
Henry Reimert
Charley Diaz
Matias Calderon

Team 7
Jordan Kreh
Brian Glover
Devin McLenagan
Chelsea May

Team 8
William Cook
Nicholas Greco
George Tang
Isaac Foote

Team 9
Fletcher Smith
Antonio Gallardo
Olivia Fiore
Payten Flanigan

Team 10
Jeremy Snyder
Robert Fink
Amir Moon
Christian Foteping Wabo

Team 11
Ethan Tang
Joseph Davis
Sarah Pfau
Sneha Sunilkumar

Team 12
Benjamin Loan
Zachary Zarus
Vincent Olindo
Kaya Ozgun

Team 13
Ethan Goldberg
Kruti Bhingradiya
Athenais Culleron-Sun
Justin Rahr

Team 14
Lars Knudsen
Samuel Lin
Sean Philips
Justin Dashiell

Team 15
William Sheesley
Brook Fikre
Nicholas Louloudes
Nalina Attanayake

Team 16
Jacob Frazee
Elizabeth Quinn
Hunter Shiblie
Daniel Corbett

Team 17
Saim Rizvi
Justin Rhoads
Gursimar Singh
Ali Hassannia

Team 18
Justin Meyer
William Rowe
Jack Getz
Lillian Spych

Team 19
Luke Brauch
Gavin Bramble
Alex Huang
Gursajan Singh

Team 20
Andrew Stevens
Alexander Hernandez
Elias Daniel
Nazifa Mahmud

Team 21
Eric Kim
Adin Goldberg
Joynob Kaoshar
Zachary Argo

Team 22
Rachel Blum
Raj Khismatrao
Kathleen Ortel

Team Project 1

- Work in 4/5 person teams to design an Earth launch vehicle

- Focus on systems engineering, systems analysis, trade studies, solid modeling, and presentation design

- Details and Level 1 requirements will be posted shortly

- Progress report (in the form of an informal PowerPoint presentation) due October 19

- Final report (also PowerPoint presentation) due November 16

Large-Scale Lunar Prospector (RASC-AL)

AFSS
Saim Rizvi
Justin Rhoads
Sneha Sunilkumar

Crew Systems
Kuds Desta
Nazifa Mahmud
Justin Dashiell

LSM
Robert Fink
Florian Grader-Beck
Cameron patillo
Samuel Lin
Matias Calderon

MPA
Elizabeth Quinn
Nicholas Greco
Saimah Siddiqui

PPT
Peter Capozzoli
Nikkole Merton
Daniel Corbett

SASE
Jordan Kreh
Gavin Bramble
Kaya Ozgun

Sustained Lunar Infrastructure (RASC-AL)

AFSS
Stephen McGowan
Evan Ramm
Jeremy Snyder

Crew Systems
Olivia Fiore
Hunter Shiblie
Vincent Olindo

LSM
Lucas Armyn
Chibueze Amos-Uhegbu
Alexander Teacu

MPA
Karan Rai
Charley Jackson Diaz
William Sheesley
Chelsea May

PPT
Luke Brauch
Brook Fikre
Henry Reimert

SASE
Andrew Stevens
Alex Huang
Gursajan Singh
Ethan Tang

Collaborative Exploration Rovers (GSFC)

AFSS

Aroni Gupta

Luca Petrescu

Nathaniel McIntyre

Fletcher Smith

Zach Zarus

Crew Systems

Lillian Spych

Payten Flanigan

Justin Meyer

Athenais Culleron-Sun

LSM

Joseph Davis

Henri Roviera

Nalina Attanayake

MPA

Benjamin Loan

Alexander Hernandez

Yimang Tang (George)

PPT

Ethan Goldberg

Nicholas Louloudes

Jack Getz

SASE

Gustavo Lang Jr

Dmitri Kontchaev

Brian Glover

Mars Simulation at the Moon (RASC-AL)

AFSS
William Cook
Caleb Hoffman
Ryan Rex

MPA
Ali Hassannia
Adam Lahr
Hailu Daniel
Christian Foteping Wabo

Crew Systems
Josh Gehres
Julia Joseph
Justin Rahr
Sarah Pfau

PPT
Antonio Gallardo
Amir Moon
Isaac Foote

LSM
Lars Knudsen
Jacob Frazee
Sean Philips

SASE
Kruti Bhingradiya
William Rowe
Devin McLenagan
Gursimar Singh

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ENAE 484 Activities – Fall 2023

- Work in your ENAE 484 teams to do the planning and initial stages of design activities for ENAE 484
  - Level 1 requirements
  - Requirements flow-down
  - Work breakdown structure
  - Design reference mission
  - Baseline systems architecture
  - List of trade studies
  - Plans for experiments/hardware development
  - Schedule for Spring term

Requirements Development

- Level 1 requirements: externally imposed by sponsor (e.g., RASC-AL, faculty)

- "Flow-down" to successively finer levels of detail, and branching into discipline areas

- Requirement Verification Matrix (RVM) should track connection between lower and higher level requirements

- Every requirement at every level should have a clear path connecting it to one or more Level 1 requirements

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Project Planning for ENAE 483/484
ENAE 483/788D – Principles of Space Systems Design

Work Breakdown Structure

- Basically an outline of everything that has to be done to complete the systems design for ENAE 484

- Hierarchical breakdown into systems, subsystems, assemblies, components, etc.

- Frequently tied into scheduling process to ensure everything gets done in a timely manner

- Write it down now so it gets done later

Design Reference Mission (DRM)/CONOPS

- Detailed description of how a standard mission should proceed from beginning to end

- Could be graphical, numerical list, prose – just needs to provide information for designing the systems that accomplish the mission, e.g.

  - Moon to Mars: where the crew is housed for the "transit" phase, how they get to/from the lunar surface, requirements for the surface base

  - Lunar Evolution: additional capabilities needed and when, plans for expansion in terms of specific surface locations or regions

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Project Planning for ENAE 483/484
ENAE 483/788D – Principles of Space Systems Design

Systems Architecture Baseline

- Closely related to DRM/CONOPS, but outlining how things happen (as opposed to what things happen)

- Conceptual representation of each component of transportation/construction/operations of each phase of program development

- Usually graphically presented with icons for each major system (e.g., transport, lander, habitat, etc.)

List of Trade Studies

- Every design decision should be based on an analytical trade study (Akin's Law #1!)

- Brainstorm the issues that affect design decisions, how you would quantify the parameters, and how you will perform the analysis to identify the best design decision

- Responsibility for each trade study should be assigned to specific group within the project

- Should also have schedule for when each trade study (design decision) should be completed

Plans for Experiments/Hardware Testing

- Each project may (should?) have a plan for incorporating hardware testing into the Spring activities

- Develop and document list of hardware development activities, with justification, challenges, and benefits

- Prioritize hardware testing objectives

- For top priorities, develop initial designs and list of items which need to be ordered prior to the end of the term

Schedule for Spring Term

- Develop a Gantt chart for 484 design activities next term
- Include Preliminary Design Review (PDR) last week of February, Critical Design Review (CDR) last week of April, comprehensive final report at the end of the term
- Include deadlines such as RASC-AL deliverables
- Set your own internal milestones/deadlines to avoid crunches around PDR/CDR

Deliverables

- Each project should document all of their development plans in the form of a Powerpoint presentation due at the end of this term

- On October 31, each project will submit their list of Level 1 requirements and drafts of any other progress at that date

Operational Notes

- Each project will have a Microsoft Teams site - USE IT! This is the most effective way to have archival access to everything submitted by each team member, and also is convenient for remote meetings

- Remember, you don't get credit for work I can't see - storing everything in Teams is the easiest solution

- You WILL need to meet as teams (both project teams and within specialty groups) to do this planning work - and it's good practice for next term