good afternoon once again we're back
down with our a lot of CubeSat briefing
cube SATs also on our Delta two rocket
to be launched on Friday morning and
here to discuss the cube sets and their
mission is garrett's crow bot the Alana
mission manager from the NASA law
services program at the Kennedy Space
Center and Roland Coelho the peapod
program lead from the california
polytechnic state university in san luis
obispo california and we'll begin first
with our project our mission manager
Garrett's cravat Garrett thank you
George good afternoon everyone and that you can make it out what an incredible opportunity we have on Friday morning to be able to launch Alana three Alana is educational launch of NATO satellite this our third in a series we have right now we look at it from the point of we're educating enhancing education through space flight the mission has six cube sets of which are five missions and if we go to the first slide nice actually the second slide but we'll go ahead and talk to it okay go back go ahead and look about
their previous slide the you know one of

NASA's missions and goals is to be able
to retain students in the mathematics

science mathematics engineering

disciplines and through the coop set

projects we were able to create a

program to acidify students drink to

strengthen NASA and the resources to do

this Alana program we had what we call

we developed dia to keep set initiative

to day just been to calls for cube sets

throughout the educational community

nonprofits and the third one is

currently on the streets and the
proposals are due in November 14th from

44 00:01:57,219 --> 00:02:00,219
these calls we've received 32 cubesat

45 00:01:58,780 --> 00:02:02,469
missions have been selected to fly so

46 00:02:00,219 --> 00:02:04,750
far and of these 32 we have 26

47 00:02:02,469 --> 00:02:08,709
manifested and a part of these are on

48 00:02:04,750 --> 00:02:10,269
the MPP mission the Alana three I put

49 00:02:08,709 --> 00:02:12,370
together this graphic area of the United

50 00:02:10,269 --> 00:02:15,060
States basically showing the states

51 00:02:12,370 --> 00:02:17,140
where the Alana project has touched two

52 00:02:15,060 --> 00:02:19,420
cubes that's being developed and has

53 00:02:17,139 --> 00:02:21,279
been selected currently there's 18 and

54 00:02:19,419 --> 00:02:25,750
we're hoping to be able to one day had

55 00:02:21,280 --> 00:02:29,199
this whole map completely filled out the

56 00:02:25,750 --> 00:02:31,689
next chart next slide please here's our

57 00:02:29,199 --> 00:02:33,759
mission patch Alana 3 we have like I
said we have five missions on board

Montana the one prime all be set for

University of Auburn University M cubed

from Michigan University of Michigan

racks to will also be from the

University of Michigan and dice from

Utah State University none of this could

be possible without the Cal Poly and the

cube into poly Pico orbital employer and

there are what will the keep Seth will

be fitted into and we'll show you that

in a little bit so and here we have our

patches indicating the educational

launch of Netta satellite so if we go to
the next image well that was the first

image we talked about but this is where

we talk i'll go ahead and go back we

talked to it anyway well what ok yeah

that's right here basically showing the

the word the international the national

concept of being able to go out and

recruit students working on the

cubes themselves maintaining the science

knowledge engineering and launching a

key element as launching education into

space for these students and given the

hands-on experience flying touching and

actually building flight hardware for a
commission which really makes them a key
entity going into the aerospace
workforce so now if you go to the next
image we'll take a look at the some of
the students here epic Cal Poly actually
integrating the Alana three missions you
see the peapod there on the lower right
hand corner fully integrated and end up
above the three cubes right before going
in with any of the project the students
act just like system engineers they do
testing they verify they check and they
ensure that everything is proper before
it goes into a if not into the vehicle
so we went to the next image the amount

00:04:24,490 --> 00:04:28,180
of three missions is going to be flight

00:04:25,720 --> 00:04:30,550
upon the second stage of the Delta Q

00:04:28,180 --> 00:04:33,668
vehicle here it's enclosed into the

00:04:30,550 --> 00:04:35,470
payload fairing this verse image shows

00:04:33,668 --> 00:04:37,389
the Delta to this would be look like on

00:04:35,470 --> 00:04:39,130
Friday night Friday morning and then

00:04:37,389 --> 00:04:40,899
down on the second stage there on the

00:04:39,129 --> 00:04:43,240
struts and then we blow it up with the

00:04:40,899 --> 00:04:45,609
3p pods on the next image up there in

00:04:43,240 --> 00:04:47,759
the upper right-hand corner so we go to

00:04:45,610 --> 00:04:50,020
the next one we showed where the actual

00:04:47,759 --> 00:04:52,599
ula engineer is actually installing the

00:04:50,019 --> 00:04:54,339
the pea pod onto the vehicle here we

00:04:52,600 --> 00:04:58,060
showed a pea pod number three with dice
and pea pod number one with e 1 prime flight to all be sad and M cube co and then pea pod number two there by itself on the other side of the vehicles racks too so if we go to the next next image this is just a layout of the the flight profile of the first two orbits once the pea pod separate approximately about 1 minute 38 seconds after t0 along this flight path you'll see we start seeing circles around South Africa Europe we have a whole network of student ground stations throughout the world that will be collecting data to determine the
likeness of the spacecraft to cube sads
as they fly around the earth to make
sure we get health and so when the
primary station starts commanding they
know they're ready to ready to go
thank you there so you know another part
of the Alana project is has been a
continuing challenge for students to fly
spacecraft of this type and in the past
that the keeps s had been built by many
universities across America and they've
been sitting on the shelf the Alana
program has now given two cubes
opportunities a continual basis to fly
right now this is a lot of three

currently a lot of four five and six

ey're already manifested on button on

the books and we'd be flying those out

through twenty twelve and thirteen so

when we wended engines light up on

friday morning hundreds of students

across America be ready sitting at

ground stations all across around the

world waiting for the first indication

of separation and the first data and

being able to get the signs down for the

different organizations I do want to

make a couple notes here that this is a

00:06:05,050 --> 00:06:09,050

00:06:07,250 --> 00:06:10,819

00:06:09,050 --> 00:06:12,650

00:06:10,819 --> 00:06:16,250

00:06:12,649 --> 00:06:18,709

00:06:16,250 --> 00:06:21,139

00:06:18,709 --> 00:06:23,389

00:06:21,139 --> 00:06:25,219

00:06:23,389 --> 00:06:27,229

00:06:25,220 --> 00:06:30,220

00:06:27,230 --> 00:06:32,990

00:06:30,220 --> 00:06:35,990

00:06:32,990 --> 00:06:37,490

00:06:35,990 --> 00:06:39,019

00:06:37,490 --> 00:06:41,590
very unique mission compared to the Llano one with we flew last bag marched

we're partnership with the National Science Foundation on this mission the Jet Propulsion Laboratory s RI and a stream are also part of our partners illness and it's very unique a couple thank-yous that I like to throw out there is our LSP management team you know they've been very supportive and believed in the Alana project and has moved forward and also a deep appreciation to the NPP project for allowing us to attach a hitch a ride on their vehicle so thank you Thank You
Garrett and now to roll in coello say

pea pod program lead from the california polytechnic state university in san luis obispo rollin thanks George thanks

Garrett so this is my first press conference it's extremely exciting I'm probably smiling from here to here right

now this is an amazing opportunity that nASA has given to us to to the students I just want to give a brief overview of the CubeSat program it started in nineteen ninety nine so we've been at this for about 12 years now and the original goal of the CubeSat program
and the CubeSat standard was to give students access to space routine affordable access and prior to that it really wasn't there and so it all started with Bob twigs and Dr. Geordie poots woori came up with the idea concept came believe it or not from a beanie baby box they had the size of the box and actually this is a satellite this is a CubeSat it's a one you when was the last time have you ever had a real satellite at a press conference before real scale so they figured out that they could get about one watt
on-orbit average power with the one you
cots components you can get them off
line something very easy and simple that
students can go ahead and build these
satellites so currently we have over 150
CubeSat developers worldwide it's truly
global and so we are working with
international partners to launch their
satellites and here in the US it's
really Ben Garratt you know in his group
here launching us universities so these
cube SATs get integrated into the poly
Pico satellite orbital deployer or or
pea pod built by Cal Poly which is this
you can see here this is full-scale this

mounts to the V struts on the Delta two

upper stage I will be showing you guys a

video of CubeSat integration actually at

Cal Poly in a little bit but this pea

pod was developed to protect the launch

vehicle on the primary payload I mean

that was the big intent deploying cube

SATs and getting them into space was

secondary but really we had to show the

US launch community that we put the

launch vehicle on the primary payload

first to reduce as much risk as possible

and so one of the interesting stories

about the sizing of the peapod actually
came from a delta to launch vehicle

there was about 99,200 we are developing the peapod and we actually went out and looked at all of the launch vehicle accommodations out there delta 2 was one of the only ones that actually had a secondary payload accommodate in their users guide so you can actually fit three of these cube sets into the peapod and the length of this pea pod is actually about the length of the Delta two secondary payload accommodations and so that’s where the form factor came about and so over the years over the
last 12 years Ilana three is our tenth

launch it's exciting for us at Cal Poly

because we finally made it to to you

know to the Delta two and two prominent

US launch vehicles this is a huge step

we originally started out with the

Russians we had three launches with them

first and then we started working

towards getting the pea pods and cube

sets on us launch vehicles and so we've

kind of come full circle in terms of

starting off as a student project going

with the Russians and now we're

launching it in our own backyard it's
absolutely amazing and so one of the

things I just wanted to tell you guys

some a brief story of how I met Garrett

I was about 21 years old went to the

small payloads rideshare conference

about six or seven years ago and I

pretty much knew nothing our advisor

Jordi puts woori said go to Denver go to

the conference have fun but get us

launches on us vehicles it was a pretty

daunting task I had no idea what I was

going myself into and so actually

talking to people at the conference a

bunch of people said you see that
gentleman over there his name's Big

00:11:58,940 --> 00:12:06,550
Daddy you have to talk to him and he's a

00:12:03,350 --> 00:12:11,480
NASA mission manager and you know I was

00:12:06,549 --> 00:12:13,309
scared to death to approach him but I

00:12:11,480 --> 00:12:17,120
started talking with them and we had an

00:12:13,309 --> 00:12:20,529
amazing conversation at the workshop he

00:12:17,120 --> 00:12:20,529
basically said that

00:12:20,590 --> 00:12:27,710
continued with the launches get flight

00:12:23,450 --> 00:12:31,520
heritage but be patient it will come one

00:12:27,710 --> 00:12:34,009
day and that was 67 years ago and you

00:12:31,519 --> 00:12:36,889
know six seven years you know till now

00:12:34,009 --> 00:12:39,919
it's an amazing experience we're finally

00:12:36,889 --> 00:12:41,750
here we have something sustainable and

00:12:39,919 --> 00:12:44,479
Garrett the biggest heart in the world

00:12:41,750 --> 00:12:49,039
you know he kept his promise and you
know and here we are today also to the
tremendous impact the Alana program has
had on the CubeSat community and the
tremendous I think one of the one of the
big things that may be lacking in some
of the education that we get in the
classroom is we don't get this real
world experience we don't get real
engineering problems we have to solve
and so if you fail a test you get an F
if you fail problems or if you can't
resolve issues you don't go on the
mission mission is over and the impact
is much widespread and so the ability to work with NASA and for the students to understand systems engineering to work with multiple disciplines with Mechanical Engineers electrical engineers computer science physicists is a tremendous opportunity and it's very difficult to find that you know to find that in the classroom and so that's what the cube set program gives and that's what NASA is allowing us to do is to really have all of these students come together build a real spacecraft get it launched and and operated on orbit so
some of the students you know at Cal Poly tremendous opportunities for them because those students get to work with Garrett and his team on a daily basis you know we understand what requirements are we understand what verifications are and so when they graduate they move directly into their job knowing full well what you know what they need to do and finally just want to thank everybody than that set NASA headquarters Jason and an NASA LSP from James Wood to Amanda to Garrett and to Bill and Larry it's been a
tremendous opportunity to you know to

00:14:47,000 --> 00:14:53,778
work with everybody and just want to

330
00:14:48,980 --> 00:14:55,970
thank everybody for working through some

of the issues that we've had you know

00:14:53,778 --> 00:14:58,429
giving up on us always saying there is

00:14:55,970 --> 00:15:01,040
an answer there is a solution we just

00:14:58,429 --> 00:15:03,588
need to go work it and that is amazing

00:15:01,039 --> 00:15:06,889
so thank you thank you rollin and now we

00:15:03,589 --> 00:15:10,550
have a feature coming up for you all

00:15:06,889 --> 00:15:13,129
we're going to let Garrett tell us a

00:15:10,549 --> 00:15:14,508
little bit about what we're going to see

00:15:13,129 --> 00:15:19,789
research directors and principal

00:15:14,509 --> 00:15:19,789
investigators from Yolanda 3 mission
took a lil bit of time out this week and put together a video describing a little bit about their to keep sets and some of the science and what they're doing at the home universities and so we just want to show that video now keeps it is a radio our Explorer it's a grant of space by City greater experiments so our mission is unique because we get to use very narrow beam very strong radars that gives us very high resolution measurements of disturbance in altitude and at the same time it as a spacecraft flies over the experimental zone we get
there are different views of the turbulence with respect to the magnetic field lines we have two websites wanted sra international and one at University of Michigan the SR I site provides information about the science operations ground-based radar Operations and also presents data that are immediately after the experiment the Michigan website provides information on the spacecraft status spacecraft health status operations and also planned experiments as well keep sets are unique in bringing together students of different academic
00:16:31,789 --> 00:16:39,588
background engineering physics power

372
00:16:36,558 --> 00:16:41,419
system communication folks who wouldn't

373
00:16:39,589 --> 00:16:43,309
normally be seen in the same room

374
00:16:41,419 --> 00:16:45,679
together or having to pool their

375
00:16:43,308 --> 00:16:47,449
energies to carry out a CubeSat mission

376
00:16:45,679 --> 00:16:50,539
and because they're doing that the

377
00:16:47,450 --> 00:16:52,460
students can then go forward and claim

378
00:16:50,539 --> 00:16:54,379
to their respective employers that they

379
00:16:52,460 --> 00:16:58,070
have a lot of interdisciplinary

380
00:16:54,379 --> 00:17:00,259
information in particular this racks to

381
00:16:58,070 --> 00:17:03,470
CubeSat is supported by the national

382
00:17:00,259 --> 00:17:06,230
science foundation and the data from it

383
00:17:03,470 --> 00:17:09,259
will be available to students decades

384
00:17:06,230 --> 00:17:11,269
from now this is an exciting time for

385
00:17:09,259 --> 00:17:14,420
all of us keeps hats are flying on a yearly basis and at our research institution we're working on a variety of remote sensing instruments and payloads that can go in future cube sets and we look forward to the day when there's not one or two going up per year for research purposes but there's maybe a dozen the name of our CubeSat is dynamic ionosphere CubeSat experiment or dice for short what dice is going to do is it's going to look at storms in the ionosphere that occur periodically especially over the United States so
this is especially interesting because it's a U.S. experiment looking at a uniquely U.S. phenomenon and these storms occur and they can disrupt systems like GPS navigation systems communication systems and surveillance systems and the atmosphere affects radio communications at all frequencies and so it's very important that we understand what's going on in the atmosphere there were 23 students involved over two years at Utah State University and they mostly worked at the space dynamics lab which is the engineering spacecraft
engineering part of Utah State University and they were involved in building the instruments. Building the satellite, they also helped with the design, doing mathematical studies of the heat transfer within the satellite. The operation of various components and they helped to design some of the mechanical components. They were very involved in the design and the building of the satellite. The National Science Foundation initiated the project and they provided 1.2 million dollars of funding but in...
addition there's been support from NASA through the Wallops Island ground-based tracking station and the Alana program to which we're very grateful for that help and the alarm program actually made it possible to launch the satellites the public can be involved by looking at the Astra website there's information there about the dice CubeSat program and there will be data shown once it becomes available and they can go to www Astra space net and we also have phone apps that are developed by Astra and we'll be putting some of the data and some of the
information on our phone apps

00:19:41,089 --> 00:19:47,999
name of our cube set is all be set one

00:19:45,019 --> 00:19:52,278
it's named after a mascot at the

00:19:47,999 --> 00:19:56,429
University I'll be and it's going to

00:19:52,278 --> 00:20:00,749
mostly look at two encapsulants we put

00:19:56,429 --> 00:20:00,749
on solar panels and see how well they

00:19:58,798 --> 00:20:03,929
mostly look at two encapsulants we put

00:20:00,749 --> 00:20:05,759
on solar panels and see how well they

00:20:03,929 --> 00:20:08,369
protection the solar panels from the harsh

00:20:05,759 --> 00:20:11,909
environment of space I think what makes

00:20:08,368 --> 00:20:15,238
probably

00:20:11,909 --> 00:20:17,700
students have worked on it we over the

00:20:15,239 --> 00:20:20,509
years we've had over a hundred probably

00:20:17,700 --> 00:20:25,528
200 undergraduate students working at no

00:20:20,509 --> 00:20:28,489
grad students know professors directly

00:20:25,528 --> 00:20:28,489
it's a complete undergraduate

00:20:28,489 --> 00:20:33,220
effect the end result is that well
hundreds of students went through a project which is NASA funded and which is also NASA inspired and they have learned our number of skills which I couldn't develop in a classroom these are skills of communication of learning management learning systems engineering and not book learning if you want but it really is learning by doing we have approached the international amateur radio community and told them about our satellite we have to just give them now the Clarion elements so they know where to look for it and when and they know
the kind of messages that's supposed to hear and then what they do is they email them to us and tell us what they heard and where they were located etc so we're going to hopefully get the news from our satellites from all over the world the public can participate by logging on to our website space dot a burn dot edu and they're going to get find the instructions on how to download the data and also where the satellite will be and when the name of our CubeSat is M cubed it stands for Michigan multi-purpose mini
SAT and the cubesat is developed by the University of Michigan. It has a camera on board that will take medium resolution images of the earth. There's a secondary payload on this cube set that was developed by NASA JPL. That payload will do some image processing. What's unique about this mission is the collaboration that was established between Michigan and JPL to develop a secondary payload. Roughly a year ago we started this effort through funding from their science technology office.
the collaboration we will be validating

hardware and a software algorithm for a

future instrument that is being
developed by NASA for in support of the decatur survey mission over the course of the entire project there are roughly 50 students involved at the University in this last year of concentrated effort with NASA JPL the core team was about ten students and we had roughly six part-time professionals at JPL also supporting the payload development they did all the hands-on work development for this keep set they did machining for the structure they developed the
subsystems built their own hardware I think the experience of developing these keep sets that the universe is very important we really look for that direct experience in our early career hire program at JPL it's been very interesting to see these students coming through the programs with their hands on experience the public can participate in this mission through the amateur satellite community where the ham radio frequencies for M cubed will be made known and they can track the data as well as at the university website um
org we will have results of the mission

our satellite is called Explorer 1 Prime

discovered the fenelon radiation belts

in 1958 our satellite is carrying one of

Van Allen's Geiger counters that was

used to discover radiation around the

planets and it was donated to us by dr.

Van Allen before he passed away about

five years ago our students began

working on explorer 1 prime in 2006 and

we've had about a hundred and
twenty-five students involved in the program during these five years oftentimes students only have the opportunity to do a design or a concept study and it's my experience that what really makes the difference is when the students are allowed to actually build their designs test them and discover that they don't really work and then they have to go back and do a redesign and then retest and this whole process of qualifying a satellite no matter what its size is for spaceflight is where the rubber really meets the road in terms of
the learning process we hope that our

00:24:55,730 --> 00:24:59,599
satellite will keep on ticking for about

00:24:58,038 --> 00:25:02,058
four months which would equal the

00:24:59,599 --> 00:25:04,639
lifetime of the Explorer run original

00:25:02,058 --> 00:25:07,158
explore one satellite we're currently

00:25:04,640 --> 00:25:10,210
building two other satellite programs

00:25:07,159 --> 00:25:12,890
one for National Science Foundation a

00:25:10,210 --> 00:25:15,350
scientific experiment to study radiation

00:25:12,890 --> 00:25:17,990
belts and a second one under the

00:25:15,349 --> 00:25:21,439
university nano set program for the Air

00:25:17,990 --> 00:25:23,390
Force Research Laboratories we believe

00:25:21,440 --> 00:25:27,288
that the real utility these very

00:25:23,390 --> 00:25:30,620
diminutive satellites is in the ability

00:25:27,288 --> 00:25:33,528
to launch large constellations dozens of

00:25:30,619 --> 00:25:35,418
satellites working together in this very
small form factor to do things that we've never been able to do in space in the past.

Alright read it out to take questions so please give your name and affiliation. Again when the mic comes to you and we'll start right over here with Nora I.

Nora Wallace Santa Barbara news-press do you have any idea how many students might be coming to the launch and also can you give us any sense of the collective cost of the satellites on this rocket I know that some of the universities are not able to bring the
students due to the class schedules but

from what I'm hearing there's probably

30 to 50 students as be in the area for

the admission but most of movie watching

it on television on the webcast back in

the university dorms or you know getting

ready for it as to the cost everyone I'm

to la believes a little bit different

day costs in a different aspect

ones like dice like they indicated was

like 1.2 million for that because it's

doing significant science where you may

have all be sad or what are the other

ones that has this to very smaller
science be a lot less Janine Scully

santa maria times lompoc record what you

mentioned some future missions what

vehicles and will those fly on and do

you know approximately what time frame

yes I'llana six will be flying in July of

2012 we have three P pods which keep

sets on it and we're partnering with the

in a row one of their missions after

that we have us CRS two and three flight

out at Kennedy scheduled for late 12 or

13 and we have four pods on crs two and

five peapods on crs three currently any

other questions Nora

other questions Nora
at this point is it is long enough in

00:27:37,470 --> 00:27:41,759
the program that you're starting to see

00:27:38,819 --> 00:27:43,138
students come to NASA and JPL and

00:27:41,759 --> 00:27:45,659
everywhere else looking for jobs that

00:27:43,138 --> 00:27:49,769
have worked on some of these case in

00:27:45,659 --> 00:27:52,190
point absolutely and a lot of the

00:27:49,769 --> 00:28:01,909
students who graduate are now working

00:27:52,190 --> 00:27:57,950
you know for these companies and they're

00:27:55,259 --> 00:28:01,909
coming back to us with cubes on ideas

00:27:57,950 --> 00:28:04,319
collaboration we see it all the time in

00:28:01,909 --> 00:28:07,889
government agencies like NASA also

00:28:04,319 --> 00:28:09,778
commercial I would want to say like the

00:28:07,888 --> 00:28:13,500
CubeSat mafia is slowly starting to

00:28:09,778 --> 00:28:16,319
spread and it's it's amazing to see that

00:28:13,500 --> 00:28:18,000
the passion still in them that they want
to come back and you know help support

their university there's actually I

believe one of the students from Cal

Poly that's supporting mpb so I was
talking to them at the hotel the other

evening all right we have no other

questions none from other centers or

online so that is going to conclude this

briefing and our next activity will be

launched coverage which will begin at

1201 a.m. pacific time on friday morning

thank you